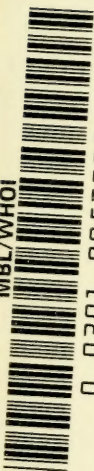








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THE UNIVERSITY OF SOUTHERN CALIFORNIA

FIRST SERIES

ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 4  
1938-1948



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REPORTS ON THE COLLECTIONS OBTAINED BY ALLAN HANCOCK PACIFIC EXPEDITIONS OF  
VELERO III OFF THE COAST OF MEXICO, CENTRAL AMERICA, SOUTH AMERICA, AND GALA-  
PAGOS ISLANDS IN 1932, IN 1933, IN 1934, IN 1935, IN 1936, IN 1937, AND IN 1938.

## HYDROIDS OF THE 1934 ALLAN HANCOCK PACIFIC EXPEDITION

*By* C. McLEAN FRASER

THE UNIVERSITY OF SOUTHERN CALIFORNIA PUBLICATIONS

ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 4, NUMBER 1

ISSUED AUGUST, 1938

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THE UNIVERSITY OF SOUTHERN CALIFORNIA PRESS

LOS ANGELES, CALIFORNIA



# HYDROIDS OF THE 1934 ALLAN HANCOCK PACIFIC EXPEDITION

(WITH FIFTEEN PLATES)

C. McLEAN FRASER

## INTRODUCTION

An invitation to accompany the 1934 Hancock Expedition on *VELERO III*, to collect coelenterates, and more especially hydroids, in such an extensive virgin area, was gladly accepted.

In the ten weeks' cruise opportunity was afforded to collect in the Revilla Gigedo Islands, the Galapagos Islands (where three weeks were spent), and the mainland coast from Guayaquil, Ecuador, to San Diego, California. The Gulf of California was not visited. Stops were made in 40 locations and collections were made at 161 stations, 104 of which were dredging stations.

In most of the area covered the sea bottom was suitable for coelenterate growth, although at times it was rough enough to make dredging somewhat difficult. The coast of northern Ecuador and of Colombia, adjacent to the tropical rain forests, provided the main exception. For an undetermined distance off shore here the bottom is covered with such a fine silt or ooze that, in places, it would not trip the bottom sampler. In this area hydroids could be obtained only by dredging in shallow water over the surface of the reefs running out from shore. With the exception of this muddy area, less material in general was obtained from the same amount of effort in the oceanic area than from the mainland coast. This does not necessarily mean that the oceanic fauna is less rich. There have been so few soundings recorded in the oceanic area and there is so little information as to the nature of the bottom that dredging is much of a speculative procedure. The Mexico coast was particularly rich in hydroids. The best catch of the whole expedition was obtained just east of the islands off Navidad Head, at the entrance to Tenacatita Bay, where 44 species were obtained at the one station.

As the detailed geography of this region is not, in general, well known, it may be wise to give here a list of the locations where collections were made, to avoid the necessity of giving the details in connection with the distribution of the species.

## LOCATIONS

Revilla Gigedo Islands,  $18^{\circ}$  to  $21^{\circ}$  N.,  $106^{\circ}$  to  $115^{\circ}$  W.

Socorro Island

In Braithwaite Bay, south shore

Clarion Island, off south shore

Clipperton Island,  $10^{\circ}17'$  N.,  $109^{\circ}13'$  W.

Galapagos Islands, between  $2^{\circ}$  N. and  $2^{\circ}$  S. and between  $89^{\circ}$  and  $92^{\circ}$  W.

Wenman Island, off the northeast coast

Narborough Island

Lagoons near east coast

Strait between Narborough and Albemarle islands

Albemarle Island

Albemarle Point to the northeast

On west coast

Banks Bay

Reef about three miles north of Tagus Cove

Tagus Cove

Christopher Point

On east coast

Cartago Bay

James Island

James Bay on west coast

Sullivan Bay to the northeast, between James and Bartholomew islands

North Seymour Island, west coast

South Seymour Island, west coast

Indefatigable Island

Academy Bay, south coast

Strait between Indefatigable and Charles islands

Charles Island

Black Beach, west coast

Postoffice Bay, northwest coast

Chatham Island

Stephens Bay, north coast

Hood Island

Gardner Bay, northeast coast, between Hood and Gardner islands

## Ecuador

- Santa Elena Bay, 80 miles north of the mouth of the Guayas River
- La Plata Island, 14 miles off the coast
- San Francisco Bay, near the northern boundary

## Colombia

- Gorgona Island, 24 miles off coast
- Cabita Bay
- Port Utria

## Panama

- Jicarón Island
- Jicarita Island
- Between Medidor and Pacora islands
- Pacora Island
- Bahia Honda
- Secas Islands

## Costa Rica

- Port Culebra
- South Viradores Islands

## Mexico

- Tangola-Tangola and Santa Cruz bays
- Petatlan Bay
  - White Friars Islands, at entrance
  - Off Morro de Petatlan
- Tenacatita Bay
  - Off Tenacatita Point
  - East of islands off Navidad Head
  - Off Navidad Head
- Isabel Island,  $17\frac{3}{4}$  miles from mainland coast
- West coast of Lower California
  - Santa Maria Bay
  - Thurloe Point
  - South Bay, Cerros Island

As the facilities for dredging were particularly good, as the conditions under which the work was done were nearly always favorable, and as all material was sorted the day it was collected, most of the specimens were preserved in very good condition and many were saved that, under less favorable conditions, might have disintegrated past



recognition. This applies particularly to gymnoblastic species, some of which deteriorate so readily. The excellence and the extent of the collection are worthy of comment.

In the text, the distribution within the area is given for all species. All new species, as well as all of those in which the gonosome has been observed for the first time, are described and figured. In referring to species already described, notation is made of the original description and in many cases, another reference to a paper in which the description, the figure, or the synonymy is given more fully. No attempt has been made to give a complete synonymy.

I am indebted to my wife and to Miss Ursula Dale, an Honors student in Zoology in the University of British Columbia, for the drawing of the figures used. These figures show the same magnification throughout—20 diameters.

To Captain G. Allan Hancock, who financed the expedition and provided the facilities and who, with the Chief Officer, W. Charles Swett, was tireless in doing everything possible in the way of arrangement to make the expedition a success, to the other biologists on board, W. L. Schmitt, H. W. Manter, W. R. Taylor, J. Garth, and F. Ziesenhenné, who were always on the lookout for useful material, and to all the other officers and men in the ship's company, who lost no opportunity to give assistance, I am under great obligation, which I am happy to be able to recognize at this time.

#### DISTRIBUTION

Of the 173 species listed, 73 are described as new, and in 5 other species the gonosome has been observed for the first time. One new genus is introduced.

Of the 100 species previously described, 77, 77%, have been reported from the North Atlantic; 52, 52%, from the eastern Pacific coast of Canada and the United States; and 13, 13%, from the southern portion of the eastern Pacific and from the waters adjacent to the southern tip of South America. Thirty-seven species have been reported from both the Atlantic and the North Pacific, 40 species from the Atlantic but not from the North Pacific, but only 15 from the North Pacific and not from the Atlantic. Of the 15, 7 were obtained from the oceanic area, two of which were from this area only; 12 were obtained from the coast of Mexico, 8 of these from the west coast of Lower

California only; and only one from the mainland coast south of south-east Mexico.

Of the 13 species that have been reported from South America farther south than the area under consideration, 10 are cosmopolitan, one, *Plumularia magellanica*, was obtained from Black Beach, Charles Island, the station nearest to the Humbolt current, and another, *Obelia obtusidens*, from Santa Elena Bay, the most southerly location at which collections were made. The remaining species, *Silicularia pedunculata*, has been previously reported only from South Georgia. Why it should appear near Secas Islands, Panama, is difficult to understand.

For the purpose of further studying the intrinsic distribution, the area covered may be somewhat arbitrarily divided into three portions: Division A, to include all the stations near the oceanic islands; Division B, to include the mainland coast south of Balboa; Division C, to include the mainland coast north and west of Balboa.

Seventy-eight species were obtained in Division A, 60 in Division B, and 115 in Division C. Eighteen species were found in each of the three divisions; 2, in A and B only; 22, in A and C only; 21, in B and C only; 35, in A only; 20, in B only; and 55, in C only.

The distribution of species in the whole area, with the possible exception of the northern portion of the coast of Lower California, indicates strong affinities between the hydroid fauna here and that in the North Atlantic, more particularly in the West Indian area. There is evidence of some continuity of distribution in the California-Lower California area but practically no indication of such continuity at the southern extremity.

The species found in this area and in the West Indian region must be old species, existing as such since the earlier geological period when, in the Panama region, there was no interruption in the distribution from the Atlantic to the Pacific and vice versa. This long period of separation has given the opportunity for the evolution of the great number of new species, indicated by the number described in this paper.

In the area itself, the indication is that there is little interference to distribution along the whole length of the mainland coast, or between the oceanic division and the northwestern division of the mainland coast, but close association is lacking between the hydroids of the oceanic area and those of the coast of Ecuador and Colombia.

In passing northward along the west coast of Lower California, the most decided break in continuity of distribution in both fauna and

flora appears to be in the vicinity of Thurloe Point. There the large kelps, so characteristic of the coasts of the United States and Canada, make their first striking appearance, and other species appear, coincident with these.

In the collection, the various families are specifically represented as follows:

#### SPECIES DISTRIBUTION BY FAMILIES

<i>Family</i>	<i>Number of species obtained</i>	<i>Number of new species</i>
Clavidae	5	4
Tubidendridae	1	1
Corynidae	8	3
Atractylidae	8	4
Eudendridae	9	3
Hydractinidae	9	8
Pennaridae	1	—
Cladocorynidae	1	—
Tubularidae	4	3
Bonneviellidae	1	1
Campanularidae	39	14
Campanulinidae	4	2
Halecidae	18	7
Hebellidae	3	1
Lafoeidae	4	2
Synthecidae	4	3
Sertularidae	22	6
Plumularidae	32	11
TOTAL	173	73

As compared with the hydroid fauna of the Pacific coast of Canada and the United States, the percentage of gymnoblastic species is high, both in the complete list and in the list of new species (46 species, 26 new). Among the calyptoblastic families, the percentage of the Sertularidae is low, except in the genus *Sertularia*, and that of the Plumularidae is high. There are no representatives of the genera, *Selaginopsis* and *Abietinaria* and only two species of *Thuiaria*, all of which are common in the more northern waters. Except in the Gymnoblastea and in one or two of the smaller families of Calyptoblastea, in which the number of new species is high, there is much the same percentage of new species throughout.

To indicate the distribution of the species in detail a table is given herewith to show the species in each area or division as well as the more general distribution to which reference has been made above.

DISTRIBUTION TABLE

<i>Species</i>	<i>Div. A</i>	<i>Div. B</i>	<i>Div. C</i>	<i>South of Div. B</i>	<i>North of Div. C</i>	<i>North Atlantic</i>
<i>Clava parva</i> .....			x			
<i>Corydendrium flabellatum</i> .....			x			
<i>Tubiclava laxa</i> .....			x			
<i>Tubiclava triserialis</i> .....	x					
<i>Turritopsis nutricula</i> .....	x		x		x	x
<i>Balea irregularis</i> .....	x					
<i>Coryne pusilla</i> .....			x			x
<i>repens</i> .....	x					
<i>Corynitis agassizii</i> .....	x		x			x
<i>Eugemmaria dendritica</i> .....			x			
<i>Gemmaria costata</i> .....	x					x
<i>gemmosa</i> .....	x	x				x
<i>Syncoryne flexibilis</i> .....		x	x			
<i>mirabilis</i> .....	x			x	x	x
<i>Bimeria gracilis</i> .....	x		x		x	
<i>laxa</i> .....	x					
<i>pygmaea</i> .....		x				
<i>tenella</i> .....	x				x	
<i>vestita</i> .....		x	x	x		x
<i>Bougainvillia crassa</i> .....		x	x			
<i>Perigonimus repens</i> .....	x	x	x	x	x	x
<i>robustus</i> .....			x			
<i>Eudendrium breve</i> .....	x					
<i>capillare</i> .....			x		x	x
<i>carneum</i> .....	x	x	x			x
<i>certicaule</i> .....	x					
<i>exiguum</i> .....		x				x
<i>nodosum</i> .....		x				
<i>ramosum</i> .....	x		x		x	x
<i>tenellum</i> .....	x	x	x		x	x
<i>tenue</i> .....	x		x			x
<i>Hydractinia carolinae</i> .....			x			x
<i>disjuncta</i> .....			x			
<i>epispongia</i> .....			x			
<i>hancocki</i> .....	x					
<i>longispina</i> .....	x					
<i>multispina</i> .....	x					
<i>polycarpa</i> .....		x				
<i>quadrigemina</i> .....			x			



<i>Species</i>	<i>Div. A</i>	<i>Div. B</i>	<i>Div. C</i>	<i>South of Div. B</i>	<i>North of Div. C</i>	<i>North Atlantic</i>
<i>Podocoryne reticulata</i> .....		x				
<i>Pennaria tiarella</i> .....	x	x	x		x	x
<i>Cladocoryne pelagica</i> .....	x	x				x
<i>Tubularia</i> sp.....		x				
<i>crocea</i> .....	x		x	x	x	x
<i>integra</i> .....	x		x			
<i>multitentaculata</i> .....			x			
<i>Bonneviella minor</i> .....	x					
<i>Campanularia emarginata</i> .....		x				
<i>flexuosa</i> .....			x			
<i>gracilicaulis</i> .....	x					
<i>hincksi</i> .....			x		x	x
<i>urceolata</i> .....			x		x	
<i>volubilis</i> .....	x		x		x	x
<i>Clytia acutidentata</i> .....	x		x			
<i>attenuata</i> .....	x				x	
<i>carinadentata</i> .....	x					
<i>coronata</i> .....			x			x
<i>cylindrica</i> .....	x		x		x	x
<i>edwardsi</i> .....	x		x		x	x
<i>fascicularis</i> .....		x	x			
<i>inconspicua</i> .....			x	x	x	x
<i>irregularis</i> .....			x			
<i>johnstoni</i> .....		x	x		x	x
<i>kincaidi</i> .....	x		x		x	x
<i>longicyatha</i> .....		x	x		x	x
<i>longithecra</i> .....			x		x	
<i>multidentata</i> .....		x				
<i>raridentata</i> .....	x		x		x	x
<i>seriata</i> .....			x			
<i>Eucopella everta</i> .....			x		x	
<i>minor</i> .....		x				
<i>Gonothyrea clarki</i> .....	x				x	x
<i>gracilis</i> .....	x	x	x	x	x	x
<i>serialis</i> .....		x				
<i>Obelia alternata</i> .....	x					
<i>articulata</i> .....	x					x
<i>commissuralis</i> .....			x		x	x
<i>dichotoma</i> .....	x	x	x		x	x
<i>equilateralis</i> .....		x				
<i>geniculata</i> .....	x			x	x	x
<i>hyalina</i> .....			x			x
<i>microtheca</i> .....		x				
<i>obtusidens</i> .....		x		x		
<i>plicata</i> .....	x	x	x		x	x
<i>tenuis</i> .....		x	x			

<i>Species</i>	<i>Div. A</i>	<i>Div. B</i>	<i>Div. C</i>	<i>South of Div. B</i>	<i>North of Div. C</i>	<i>North Atlantic</i>
<i>Silicularia pedunculata</i> .....			x	x		
<i>Campanulina ramosa</i> .....	x					
<i>Cuspidella humilis</i> .....		x	x		x	x
<i>Lovenella nodosa</i> .....		x	x			
<i>producta</i> .....		x			x	x
<i>Endothecium reduplicatum</i> .....			x			
<i>Halecium articulatum</i> .....			x		x	x
<i>beani</i> .....	x	x	x		x	x
<i>bermudense</i> .....	x					x
<i>corrugatum</i> .....		x			x	
<i>fasciculatum</i> .....	x					
<i>flabellatum</i> .....			x			
<i>gracile</i> .....			x			x
<i>halecinum</i> .....		x	x		x	x
<i>insolens</i> .....			x			
<i>nanum</i> .....			x			x
<i>regulare</i> .....			x			
<i>tenellum</i> .....	x		x	x	x	x
<i>tortum</i> .....			x			
<i>vagans</i> .....		x	x			
<i>washingtoni</i> .....	x		x		x	
<i>Ophiodissa laxa</i> .....			x			
<i>negligens</i> .....		x				
<i>Hebella calcarata</i> .....			x			x
<i>Scandia corrugata</i> .....			x			
<i>mutabilis</i> .....	x	x	x			x
<i>Filellum serpens</i> .....	x	x	x		x	x
<i>Lafoea intermedia</i> .....	x		x			
<i>Lictorella adhaerens</i> .....	x					
<i>cervicornis</i> .....	x				x	
<i>Synthecium gracile</i> .....		x	x			x
<i>projectum</i> .....			x			
<i>rigidum</i> .....		x	x			
<i>symmetricum</i> .....		x	x			
<i>Diphasia paarmani</i> .....	x					x
<i>Pasya quadridentata</i> .....	x	x	x			x
<i>Sertularella ampullacea</i> .....		x	x			
<i>conica</i> .....	x		x	x	x	x
<i>exilis</i> .....			x			
<i>formosa</i> .....		x	x			x
<i>fusiformis</i> .....	x				x	x
<i>incisa</i> .....			x			
<i>rugosa</i> .....	x		x		x	x
<i>tenella</i> .....	x	x	x		x	x
<i>turgida</i> .....			x		x	

<i>Species</i>	<i>Div. A</i>	<i>Div. B</i>	<i>Div. C</i>	<i>South of Div. B</i>	<i>North of Div. C</i>	<i>North Atlantic</i>
<i>Sertularia anceps</i> .....		x	x			
<i>cornicina</i> .....			x			x
<i>desmoides</i> .....	x		x		x	
<i>dispar</i> .....		x	x			
<i>exigua</i> .....			x			x
<i>furcata</i> .....			x		x	
<i>mayeri</i> .....		x	x			x
<i>stookeyi</i> .....	x	x	x			x
<i>versluysi</i> .....	x					x
<i>Thuiaria simplex</i> .....		x	x			
<i>tubuliformis</i> .....	x	x	x			x
<i>Aglaophenia diegensis</i> .....	x		x		x	
<i>inconspicua</i> .....	x		x		x	
<i>praecisa</i> .....			x			
<i>rigida</i> .....			x			x
<i>Antennella avalonia</i> .....			x		x	
<i>compacta</i> .....			x			
<i>gracilis</i> .....	x		x			x
<i>Antennularia alternata</i> .....	x					
<i>irregularis</i> .....		x				
<i>tetraseriata</i> .....	x					
<i>Cladocarpus tortus</i> .....		x				
<i>Diplocheilus allmani</i> .....			x		x	
<i>Lytocarpus philippinus</i> .....		x	x			x
<i>Monostaechas quadridens</i> .....	x	x	x			x
<i>Plumularia acutifrons</i> .....			x			
<i>alicia</i> .....			x		x	
<i>alternata</i> .....	x	x	x			x
<i>biarmata</i> .....			x			
<i>côrrugata</i> .....			x		x	x
<i>defecta</i> .....			x			
<i>delicata</i> .....	x					
<i>filicula</i> .....		x				x
<i>floridana</i> .....	x	x	x			x
<i>inermis</i> .....	x					x
<i>lagenifera</i> .....	x		x		x	x
<i>magellanica</i> .....	x			x		
<i>margaretta</i> .....		x				x
<i>propinqua</i> .....			x			
<i>setacea</i> .....	x				x	x
<i>sinuosa</i> .....	x					
<i>Schizotricha tenella</i> .....			x			x
<i>Streptocaulis pulcherrimus</i> .....	x					x

## SYSTEMATIC DISCUSSION

There is no necessity of saying much in the way of general discussion under this heading. Some changes have been made in nomenclature since early papers were published but nearly all of these have been introduced in more recent papers hence further reference is not necessary as far as they are concerned. There is one additional change. On account of priority difficulties, the genus *Pasythea* becomes *Pasya*, the name introduced by Stechow.

One new genus, *Eugemmaria*, is introduced that bears enough resemblance to *Gemmaria* to justify the name.

## Suborder GYMNOBLASTEA

## Family Clavidae

## Genus CLAVA

*Clava parva*, new species

Plate 1, Fig. 1

*Trophosome*.—Solitary, scattered zooids arising from a thin encrustation on a gastropod shell; no stolon showing superficially; zooids small, 2 mm. high; tentacles about 20 in number, scattered, but leaving a considerable portion around the mouth free.

*Gonosome*.—Sporosacs in a single compact cluster, surrounding the hydrocaulis immediately below the proximal tentacles.

*Distribution*.—Jicarita Island, 30 fathoms. This is an unusual depth in which to find *Clava*, which is commonly littoral.

## Genus CORYDENDRIUM

? *Corydendrium flabellatum*, new species

Plate 1, Fig. 2

*Trophosome*.—Colony coarse, flabellate, fascicled, 6 cm.; the irregularly placed branches are much more slender than the main stem. The coenosarc fills but a small portion of the perisarc tubes, that go to form the fascicle. The free portion of the tube that passes out to the base of the hydranth is long and gradually curved outward from the stem or branch. This tube is very coarse, 0.4 mm. in diameter. The hydranth is stout with 20-24 tentacles.



*Gonosome*.—Not observed.

*Distribution*.—Off Secas Islands, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms; off Isabel Island, 10-25 fathoms.

### Genus **TUBICLAVA**

#### **Tubiclava laxa**, new species

Plate 1, Fig. 3

*Trophosome*.—A colony consists of numerous individual zooids growing out singly from a crust on the surface of gastropod shells; no stoloniferous network shows at the surface. The zooids are protected by a heavy, loose-fitting tube, reaching to the base of the hydranth; this tube may have numerous sand grains embedded in it. In the nutritive zooids, this tube has a maximum length of 35 mm.; it is nearly tubular or, in some cases, slightly tapering from tip to base. The hydranth is clavate, with 12-14 scattered tentacles.

*Gonosome*.—The tube of the generative zooid is short, less than 1 mm., but of much the same diameter as that of the nutritive zooid. The sporosacs are closely crowded on the blastostyle; there may be as many as 20 of them.

*Distribution*.—Tangola-Tangola, near shore, 15-20 fathoms.

#### ?**Tubiclava triserialis**, new species

Plate 1, Fig. 4

*Trophosome*.—Zooids arising singly from a loosely reticular stolon to a height of about 3 mm.; the uncovered hydranth is three eighths of the total length. It is short and stoutly clavate with 20-24 tentacles arranged rather definitely in three closely placed series. The perisarcal tube, which is smooth, is thin but distinct.

*Gonosome*.—Not observed.

*Distribution*.—On coral, exposed at low tide, along the shore of Braithwaite Bay.

### Genus **TURRITOPSIS**

#### **Turritopsis nutricula** McCrady

*Oceania nutricula* MCCRADY, Proc. Elliott Soc., 1859, pp. 55-90.

*Turritopsis nutricula* MCCRADY, *ibid.*, p. 127.

FRASER, Hydroids of Beaufort, 1912, p. 345.

*Distribution*.—On sponges associated with solitary corals, exposed at low tide, on the north shore of Tagus Cove; Gorgona Island, on coral, at low tide; South Viradores Island, 8-10 fathoms.

Family **Tubidendridae**Genus **BALEA****Balea irregularis**, new species

Plate 1, Fig. 5

*Trophosome*.—Colony fascicled, 6 cm. in length, with few irregularly placed branches, much more slender than the main stem. Some of the tubes have naked coenosarc for at least a portion of their length. The hydranths appear on the branches only, growing from short hydrophores that are sessile on two of the tubes, one on each side of the branch; these are very irregularly arranged, sometimes quite isolated, sometimes with two in succession forming a definite pair, sometimes, on the distal portion of the branches, more segregated. The hydranth and its pedicel, both stout, are without visible perisarc, about 2 mm. long.

There are two sets of filiform tentacles, the proximal, having the appearance of being reduced in size and number (4), well separated from the distal set of 10-12 well-developed tentacles.

The sarcostyles are numerous on the main stem and the branches.

*Gonosome*.—Not observed.

*Distribution*.—Dredged in the open passage between Indefatigable and Charles islands, 65-70 fathoms.

This species bears much resemblance to *Balea mirabilis* Nutting; the most noticeable difference is in the nature of the proximal tentacles.

Family **Corynidae**Genus **CORYNE****Coryne pusilla** Gaertner

*Coryne pusilla* GAERTNER, Pall. Spicil. Zool., I, Fasc. 10, 1774, p. 40.

HINCKS, British Hydroid Zoophytes, 1868, p. 39.

*Distribution*.—South Bay, Cerros Island, 10-15 fathoms.

**Coryne repens**, new species

Plate 1, Fig. 6

*Trophosome*.—Colony consisting mainly of individual hydroids arising from a creeping stolon that does not form any definite network over its support; the stolon is somewhat wavy but seldom distinctly

annulated. The hydranths appear on pedicels that may be as short as the hydranths themselves; the pedicels are distinctly annulated through quite a portion of their length. Occasionally branching takes place, in which case the main stem becomes more elongated. The hydranths are large, up to 2 mm. in length, with numerous rather slender capitate tentacles, quite evenly scattered over the whole surface.

*Gonosome*.—The sporosacs appear between the tentacles near the base of the hydranth.

*Distribution*.—Creeping over coralline at low tide, on Black Beach.

This species bears some resemblance to *Coryne crassa* Fraser, but is not so much inclined to branch. The hydranth is not so stout and the tentacles are more numerous and much more slender.

### Genus CORYNITIS

#### *Corynitis agassizii* McCrady

*Corynitis agassizii* MCCRADY, Gymno. Charleston Har., 1859, p. 30.

*Distribution*.—On sponge at low tide, Wenman Island; Jicarón Island, 30 fathoms.

### Genus EUGEMMARIA, new genus

*Trophosome*.—Zooids, like those of *Gemmaria*, grow from a strongly dendritic, reticular, or vesicular, chitinous support, which evidently is part of the colony.

*Gonosome*.—Gonophores produce sporosacs.

#### *Eugemmaria dendritica*, new species

Plate 2, Fig. 7

*Trophosome*.—Colony reaching a height of 7 cm., strongly branched, commonly dichotomously, the branched colony being almost as broad as it is high. The chitinous portion seems to be made of tube-like structures with cross partitions. The hydranths look like those of *Gemmaria gemmosa*; sessile, elongate when extended, with numerous short, strongly capitate tentacles arranged in more or less regular whorls.

*Gonosome*.—Globular or oval sporosacs, with very short pedicels, spring from the framework without regularity of position or definite relation to the nutritive zooids; greatest length 0.4 mm.

*Distribution*.—White Friars Islands, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms.

Genus **GEMMARIA****Gemmaria costata** (Gegenbaur)

*Zanclaea costata* GEGENBAUR, Zeit. für Wissen. Zool., Bd. VIII, 1856, p. 229.

*Gemmaria costata* MAYER, The Hydromedusae, I, 1910, p. 49.

*Distribution*.—On coral at low tide, Braithwaite Bay.

**Gemmaria gemmosa** McCrady

*Gemmaria gemmosa* MCCRADY, Gymno. Charleston Har., 1859, p. 49.

*Distribution*.—On sponge from reef north of Tagus Cove; on gastropod shell, Gardner Bay, 25-35 fathoms; Port Utria, 15-20 fathoms.

Anna B. Hastings has reported a species, *Zanclaea protecta*, (Ann. and Mag. Nat. Hist., (5), X, 1930, pp. 552-560), from James Bay, James Island, from Gorgona Island, and from Taboga Island, but it has not been observed in this collection.

Genus **SYNCORYNE****Syncoryne flexibilis**, new species

Plate 2, Fig. 8

*Trophosome*.—Zooids growing singly from a creeping stolon; long and slender, reaching a height of 20 mm. but varying much in height; perisarc thin, hence the pedicel is not rigid; no annulations. Hydranths large, with 50 or more tentacles, more crowded than usual.

*Gonosome*.—Medusa-buds thickly clustered above the proximal tentacles.

*Distribution*.—Gorgona Island, 20 fathoms; Port Utria, on coral at low tide, in 20 fathoms and in 40 fathoms; Jicarón Island, 15 fathoms; Secas Islands, 15 fathoms; east of islands off Navidad Head, 25-35 fathoms.

**Syncoryne mirabilis** (L. Agassiz)

*Coryne mirabilis* L. AGASSIZ, Cont. Nat. Hist. U.S., IV, 1862, p. 185.

*Syncoryne mirabilis* FRASER, Hyd. of Vancouver Island, 1914, p. 114.

*Distribution*.—Wenman Island; north shore of Tagus Cove; Black Beach; all at low tide.



Family **Atractylidae**Genus **BIMERIA****Bimeria gracilis** Clark

*Bimeria gracilis* CLARK, Hyd. of Pacific Coast, 1876, p. 252.

FRASER, Hyd. of Vancouver Island, 1914, p. 115.

*Distribution*.—James Bay, 50-70 fathoms; Bahia Honda, low tide; South Viradores Islands, 8-10 fathoms; north of White Friars Islands, 5-10 fathoms; Isabel Island, 10-25 fathoms.

? **Bimeria laxa**, new species

Plate 2, Fig. 9

*Trophosome*.—Colonies, reaching a height of 6 cm., are fascicled in an unusual manner; there is one central tube much larger than the peripheral tubes that cover it loosely, so that much of it is exposed; this applies not only to the main stem but to the main branches, that are few in number and irregularly arranged. Short, slender branches or branchlets are given off irregularly from the main stem as well as from the branches, at an acute angle; the pedicels are short and wrinkled but not distinctly annulated. The portion of the perisarc that surrounds the base of the hydranth is rugose; hydranth small, with 9-10 tentacles.

*Gonosome*.—Not observed.

*Distribution*.—Academy Bay, 17-22 fathoms.

? **Bimeria pygmaea**, new species

Plate 2, Fig. 10

*Trophosome*.—Minute, solitary zooids, 0.4 mm. high, grow at quite regular intervals from a linear stolon, which has scarcely any branches. The perisarc on the pedicel, as well as that which grows over the base of the hydranth, is wrinkled. Tentacles 10-12.

*Gonosome*.—Not observed.

*Distribution*.—Santa Elena Bay, 8-12 fathoms.

**Bimeria tenella** Fraser

*Bimeria tenella* FRASER, California hydroids, 1925, p. 168.

*Distribution*.—In outer Cartago Bay, 32 fathoms.



**Bimeria vestita** Wright

*Bimeria vestita* WRIGHT, Edinburgh N.P. Jour. (N.S.), 1859, p. 109.  
HINCKS, British Hyd. Zoophytes, 1868, p. 103.

*Distribution*.—San Francisco Bay, 2 fathoms; east of islands off Navidad Head, 25-35 fathoms.

Genus **BOUGAINVILLIA****Bougainvillia crassa**, new species

Plate 3, Fig. 11

*Trophosome*.—Stem coarse, fascicled, reaching a height of 6 cm.; branches slender as compared with the stem, some of them fascicled in the proximal portion; large branches somewhat regularly arranged, with smaller branches between less regularly placed; ultimate branchlets numerous, giving the whole colony a flabellate appearance. Stem, branches, and branchlets somewhat wrinkled but not annulated. Hydranths small, with 8-10 tentacles.

*Gonosome*.—Medusa-buds appear singly, attached by short pedicels to the ultimate branchlets.

*Distribution*.—Santa Elena Bay, at low tide, in 7-8 fathoms and in 10-12 fathoms; Port Culebra, 3-10 fathoms; Tangola-Tangola, 15-20 fathoms.

Genus **PERIGONIMUS****Perigonimus repens** (Wright)

*Eudendrium repens* WRIGHT, Proc. Roy. Phys. Soc. Edinburgh, 1858, p. 448.

*Atractylis repens* WRIGHT, *ibid.*, p. 450.

*Perigonimus repens* FRASER, Hyd. of Vancouver Island, 1914, p. 120.

*Distribution*.—Off Clipperton Island, 65 fathoms; Tagus Cove, 10-18 fathoms and in 70 fathoms; Post Office Bay, 10-15 fathoms; Cartago Bay, 8-12 fathoms; between Charles and Indefatigable islands, 60 fathoms; Gardner Bay, 25-35 fathoms; Santa Elena Bay, 10-12 fathoms; Port Culebra, 3-10 fathoms; Isabel Island, 10-25 fathoms; Santa Maria Bay, 10 fathoms.

**?Perigonimus robustus**, new species

Plate 3, Fig. 12

*Trophosome*.—Colony slender, unbranched, reaching a height of 60 mm. Stem continuous throughout but not very straight or rigid;

annulated or wavy throughout the whole length. Zooids given off irregularly from all sides of the stem, the pedicel of each making an acute angle with the stem; pedicel increases in diameter as it passes out so that the distal portion bears some resemblance to a hydrotheca; annulations or wrinkles close together in the proximal half or two thirds, farther apart in the distal portion. Hydranth with 9-10 tentacles.

*Gonosome*.—Not observed.

*Distribution*.—Petatlan Bay, 5-10 fathoms; Isabel Island, 10-25 fathoms.

This species looks much unlike any other species of *Perigonimus* that has been described, especially as regards size, but it seems to fit better with this genus than elsewhere and without the gonosome it cannot be placed more definitely. It is just possible that if the gonosome were known it might be necessary to place it in a new genus.

### Family Eudendridae

#### Genus EUDENDRIUM

##### *Eudendrium breve*, new species

Plate 3, Fig. 13

*Trophosome*.—Individual zooids arising singly from an irregularly reticulate stolon, the hydranth with its pedicel reaching a height of 2 mm.; stolon smooth; pedicel smooth, slightly wrinkled or with few irregular annulations. Hydranths conspicuous with about 20 tentacles.

*Gonosome*.—Not observed.

*Distribution*.—Black Beach, low tide.

This species has a more extensive and more closely reticulate stolon than *E. tenellum*. It is not so slender as compared with the length of the pedicel as this species is, and the individual zooids are much more closely placed on the stolon. There were no gonophores of either sex on any of the colonies obtained.

##### *Eudendrium capillare* Alder

*Eudendrium capillare* ALDER, Ann. and Mag. Nat. Hist. (2), XVIII, 1856, p. 355.

FRASER, Hyd. of Vancouver Island, 1914, p. 122.

*Distribution*.—Pacora Island, 15-25 fathoms; Secas Islands, 25 fathoms.

**Eudendrium carneum** Clarke

*Eudendrium carneum* CLARKE, Hyd. of Chesapeake Bay, 1882, p. 137.

FRASER, Beaufort Hyd., 1912, p. 349.

*Distribution*.—South of Clarion Island, 50 fathoms; James Bay, 20 fathoms; between Charles and Indefatigable islands, 60 fathoms; San Francisco Bay, 2 fathoms; east of islands off Navidad Head, 25-35 fathoms.

**Eudendrium certicaule**, new species

Plate 3, Fig. 14

*Trophosome*.—Colony erect, reaching a length of 6 cm. The main stem is simple, straight, definitely continuous throughout the whole length of the colony, more markedly so than is commonly the case in this genus. The branches, alternate but not very regularly arranged, make a wide angle with the stem; the branchlets of the pedicels are similarly arranged on the branches. Few or no annulations on the main stem, 2-4 at the bases of the branches, branchlets, and pedicels. Hydranths with 15 or 16 tentacles.

*Gonosome*.—Male gonophores, single-chambered, form a loose series around the base of the hydranth, that is not aborted. Female gonophores form a series of 3 or 4 around the base of the hydranth, which is not aborted.

*Distribution*.—In the channel between Narborough and Albemarle islands, 70 fathoms; James Bay, 30-50 fathoms; between Charles and Indefatigable islands, 60 fathoms.

**Eudendrium exiguum** Allman

*Eudendrium exiguum* ALLMAN, Hyd. of the Gulf Stream, 1877, p. 6.

*Distribution*.—Gorgona Island, on coral at low tide.

**Eudendrium nodosum**, new species

Plate 4, Fig. 15

*Trophosome*.—Colonies slender, 35 mm. high; branching irregular, one or two primary branches commonly giving rise to the hydranth pedicels directly and these may all be on the one side of the branch;

hydranths also arising from the main stem; stem and main branches scarcely annulated, although there may be nodes at infrequent intervals. Pedicels with one or more annulations or wrinkles, at no definite location on the pedicel. Hydranth with about 20 tentacles.

*Gonosome*.—Not observed.

*Distribution*.—Santa Elena Bay, 10 fathoms.

### **Eudendrium ramosum (Linn.)**

*Tubularia ramosa* LINNAEUS, Syst. Nat., 1767, p. 1302.

*Eudendrium ramosum* HINCKS, British Hyd. Zoophytes, 1868, p. 82.

*Distribution*.—Post Office Bay, on coral at low tide and in 8-10 fathoms; Bahia Honda, 15-25 fathoms; Secas Islands, 15 fathoms; Tangola-Tangola, 15-20 fathoms; north of White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms; Isabel Island, 10-25 fathoms; Santa Maria Bay, 35-40 fathoms; Thurloe Point, 8-10 fathoms.

### **Eudendrium tenellum Allman**

*Eudendrium tenellum* ALLMAN, Hyd. of the Gulf Stream, 1877, p. 8.

FRASER, Hyd. of Vancouver Island, 1914, p. 123.

*Distribution*.—Off Wenman Island, 100-150 fathoms; in channel between Narborough and Albemarle islands, 70 fathoms; between Charles and Indefatigable islands, 120 fathoms; Gardner Bay, 25-35 fathoms; San Francisco Bay, 2 fathoms; Gorgona Island, 20 fathoms; Bahia Honda, 15-25 fathoms; Tangola-Tangola, 15-20 fathoms; east of islands off Navidad Head, 25-35 fathoms.

### **Eudendrium tenue A. Agassiz**

*Eudendrium tenue* A. AGASSIZ, N. A. Acalephae, 1865, p. 160.

NUTTING, Hyd. Woods Hole, 1901, p. 333.

*Distribution*.—South of Clarion Island, 50 fathoms; Tagus Cove, 30 fathoms; Black Beach, near shore; north of White Friars, 5-10 fathoms.

Family **Hydractinidae**Genus **HYDRACTINIA****Hydractinia carolinae** Fraser

*Hydractinia carolinae* FRASER, Beaufort Hyd., 1912, p. 351.

*Distribution*.—South Viradores Islands, 8-10 fathoms; Tangola-Tangola, 15-20 fathoms.

**Hydractinia disjuncta**, new species

Plate 4, Fig. 16

*Trophosome*.—Nutritive zooids small, with 10-12 tentacles, scattered over the surface of a gastropod shell, inhabited by a hermit crab.

*Gonosome*.—Female generative zooids much smaller than the nutritive, with the tentacles short and only four or five in number; sparsely scattered throughout the colony. Sporosacs single or in pairs, opposite (these may not be at the same stage of development), arising about half way from the base to the tentacles; ova 6-8 in number.

Male zooids not observed.

*Other zooids*.—No dactylozooids or sensory zooids. The spines are quite numerous; they may be almost as high as the generative zooids; smooth, slightly curved to a blunt point.

*Distribution*.—Jicarita Island, 30 fathoms; Port Culebra, 3-10 fathoms.

**Hydractinia epispongia**, new species

Plate 4, Fig. 17

*Trophosome*.—Colony growing over a dense calcareous sponge; nutritive zooids small, the most extended 0.6 mm. long, with 7 or 8 tentacles.

*Gonosome*.—Male generative zooids shorter and much more slender than the nutritive; without tentacles but the distal end much swollen, made up largely of batteries of nematocysts. Sporosacs of different sizes appear on the basal half; sometimes these are distinctly pedicellate; up to 5 in number.

Female zooids were not observed.

*Other zooids*.—Zooids like the generative zooids but without sporosacs are numerous in some areas. Whether they, or any of them, remain



purely offensive and defensive zooids (spiral zooids) there was no means of telling from the specimens.

*Spines*.—There were no spines. The individual zooids fit into cavities in the sponge skeleton and apparently need no further protection of that nature.

*Distribution*.—East of the islands off Navidad Head, 25-35 fathoms.

### **Hydractinia hancocki**, new species

Plate 4, Fig. 18

*Trophosome*.—Colonies growing on small-ribbed gastropod shells, with the basal coenosarc forming a loose network, the meshes fitting into the sulci of the shell. There are no definite spines; sometimes closely crowded, there are brown spheroidal bodies, looking like the basal bodies of real spines. In some colonies, however, none of these was observed. The nutritive zooids are slender, reaching a height of 1.8 mm. The tentacles are few in number, 12-16, arranged in one irregular series.

*Gonosome*.—The generative zooids are smaller than the nutritive, and the tentacles are reduced in number, commonly 4. The male gonophores vary in number, up to 7, placed some distance proximal to the tentacles, not in a regular series. The female sporosacs are placed similarly to those in the male and are even more irregular in position. The ova are few, with 6 as a maximum.

*Other zooids*.—None observed.

*Distribution*.—Black Beach, at low tide; Post Office Bay, 12-15 fathoms; Stephens Bay, 32 fathoms; west of South Seymour Island, 5 fathoms; Sullivan Bay, 6 fathoms; Cartago Bay, 8-12 fathoms; between Charles and Indefatigable islands, 60 fathoms; Gardner Bay, 20 fathoms.

### **Hydractinia longispina**, new species

Plate 4, Fig. 19

*Trophosome*.—Colony growing from a basal coenosarc, consisting of a close network from which arise several elongated spines. The nutritive zooids are long, 3 mm., but rather slender, with numerous (30 or more) long, slender tentacles, not definitely arranged in series.

*Gonosome*.—The generative zooids are but slightly reduced in size, if at all; the number of tentacles varies but there is seldom more than half of the number found on the nutritive zooids. The sporosacs are

situated about midway up on the hydrocaulis. The male sporosacs are few, arranged in an irregular series. The large female sporosacs are much more numerous in a somewhat irregularly crowded series; the ova in each sporosac are numerous, but because the sporosacs are so large the ova are still quite large.

*Other zooids.*—None observed.

*Spines.*—The elongated spines or, more properly speaking, tubes, since they do not seem to be closed at the slightly tapered distal end, are smooth, 1.5 mm. long; some of them shorter, seem to be broken off.

*Distribution.*—Tagus Cove, 10-18 fathoms; Post Office Bay, 8-10 fathoms.

### ***Hydractinia multispina*, new species**

Plate 4, Fig. 20

*Trophosome.*—Large colonies growing from basal coenosarc, made up of a network so close that it is practically continuous. The nutritive zooids are large for the genus, as much as 3.5 mm. long when contracted. The tentacles are numerous, 36, in two quite definite series.

*Gonosome.*—Although colonies were obtained from four localities, they were all female. The generative zooids are somewhat smaller than the nutritive, and the tentacles are reduced in number, 12-15. The sporosacs are few, 4 or 5, attached just proximal to the tentacles, with a few, not more than 8, ova in each.

*Other zooids.*—None observed.

*Spines.*—From the coenosarc base arise numerous smooth spines, nearly cylindrical but tapering slightly to a blunt tip, most of them about 0.6 mm. in length but some of them slightly longer.

*Distribution.*—On large shells between Charles and Indefatigable islands, 60 fathoms; Post Office Bay, 10 fathoms and 12-15 fathoms; Black Beach, low tide.

### ***Hydractinia polycarpa*, new species**

Plate 5, Fig. 21

*Trophosome.*—Nutritive zooids in greatest extension 1.8 mm., with 8-10 tentacles.

*Gonosome.*—Female generative zooids, shorter, 1.0 mm., and more slender than the nutritive zooids; no tentacles; the distal end is somewhat swollen and is well provided with nematocysts; the swollen end is much darker than the rest of the zooid, a dark brown, almost a

black, in some of the preserved specimens. Sporosacs numerous, as many as 10, forming a dense cluster around the distal half of the zooid; 2 to 4 ova in each sporosac.

No male specimens were obtained.

*Other zooids*.—Dactylozooids numerous, forming almost a continuous row in some places at the margin of the colony.

*Spines*.—Spines are numerous, rather small, slender, tapering to the point, slightly rough at the margins.

*Distribution*.—Santa Elena Bay, 7-12 fathoms.

### **Hydractinia quadrigemina, new species**

Plate 5, Fig. 22

*Trophosome*.—Colony growing on the surface of a gastropod shell; largest nutritive zooids 2.5 mm., with 15 or 16 tentacles.

*Gonosome*.—Female generative zooids somewhat smaller than the nutritive, with tentacles well developed but not numerous, 6-8. Usually there is but one sporosac, although a small one may appear opposite the fully developed one, a short distance below the base of the tentacles. Sporosacs large, spherical, with four large ova.

No male specimens observed.

*Other zooids*.—None observed.

*Spines*.—The spines are conspicuous but not very numerous; they may reach a length of nearly 1.0 mm.; smooth, tapering very gradually, slightly curved.

*Distribution*.—Off Isabel Island, 10-25 fathoms.

### **Genus PODOCORYNE**

#### **Podocoryne reticulata, new species**

Plate 5, Fig. 23

*Trophosome*.—Individual zooids arise from a stolon that follows the groove between successive whorls in the shell of a gastropod; the whorls are ribbed and cross connections of the stolon lie almost entirely in the sulcus formed by the ribbing. The nutritive zooids are small, about 0.7 mm., with 10-12 tentacles.

*Gonosome*.—The generative zooids are but little smaller than the nutritive zooids and the number of tentacles is but slightly reduced, 6 or 7. The medusa-buds are borne just below the tentacles; there is

commonly but one bud to a zooid, but often two, seldom more. Occasionally a bud is borne directly on the stolon.

*Other zooids*.—None observed. No spines.

*Distribution*.—Santa Elena Bay, 8-12 fathoms.

The protection given by the ribbing of the shell makes the usual calcareous deposits on the stolon unnecessary.

### Family **Pennariidae**

#### Genus **PENNARIA**

#### **Pennaria tiarella** McCrady

*Pennaria tiarella* MCCRADY, Gymnoph. of Charleston Har., 1859, p. 51.

FRASER, Beaufort Hyd., 1912, p. 355.

*Distribution*.—North shore, Wenman Island, low tide; Post Office Bay, 12-15 fathoms; Santa Elena Bay, 5-12 fathoms; San Francisco Bay, 2 fathoms; Port Culebra, low tide.

### Family **Cladocorynidae**

#### Genus **CLADOCORYNE**

#### **Cladocoryne pelagica** Allman

*Cladocoryne pelagica* ALLMAN, Linn. Soc. Jour., 1876, p. 255.

*Distribution*.—Braithwaite Bay, on coral at low tide; Santa Elena Bay, 10-12 fathoms.

### Family **Tubularidae**

#### Genus **TUBULARIA**

#### **Tubularia** sp.

*Trophosome*.—Several young tubularians were scattered over a gastropod shell, none of them more than 2 mm. high and most of them less than 1.5 mm. The light-colored perisarc is heavy enough to give the zooid a rigid appearance; it is smooth and ends abruptly some short distance below the base of the hydranth, the exposed portion being much more slender than the portion within the perisarc. The basal tentacles are 14 or less and the oral tentacles 10 or less in number.



*Gonosome*.—None of the zooids was mature.

*Distribution*.—Santa Elena Bay, 8-12 fathoms.

These specimens seem unlike any other American species of this genus but as they are immature it does not seem advisable to give them a name.

### ***Tubularia crocea* (Agassiz)**

*Parypha crocea* AGASSIZ, Contr. Nat. Hist. U.S., IV, 1862, p. 249.

*Tubularia crocea* FRASER, Hyd. of Vancouver Island, 1914, p. 127.

*Distribution*.—Tagus Cove, in 30 fathoms and on coral and sponges at low tide; Jicaron Island, 30 fathoms.

### ***Tubularia integra*, new species**

Plate 5, Fig. 24

*Trophosome*.—Individual zooids growing singly, at irregular intervals from a loosely reticulate stolon, reaching a height of 25 to 30 mm. The stolon is slightly annulated but the pedicels are entirely smooth, tapering slightly to a greater diameter at the base of the hydranth; somewhat swollen just proximal to the constriction where the support of the hydranth takes place. The basal tentacles, 25-32 in number, are long and slender as compared with the proximal that are short and stout for their length; they are much fewer, 8-12.

*Gonosome*.—Gonophores appear on short processes, sometimes almost sessile; there are four well-separated, but very low, tentacular processes.

*Distribution*.—Stephens Bay, 35 fathoms; west of South Seymour Island, 5 fathoms; Pacora Island, 15-25 fathoms; Medidor Island, at low tide on coral.

### ***Tubularia multitentaculata*, new species**

Plate 6, Fig. 25

*Trophosome*.—Solitary zooids are large, up to 2 cm., with a heavy brown perisarc covering the pedicel except for a short distance at the distal end. Hydranth large, with 20-24 long proximal tentacles and very numerous, up to 100, distal tentacles.

*Gonosome*.—Gonophores with a tendency to form clusters, but the pedicels are short and unbranched; the radial canals show distinctly; when mature, they are large, 1.3 mm. in length. The distal end is not



provided with tentacular processes, although when the actinulae are partly dehiscid, that gives the appearance of distal processes.

*Distribution*.—Thurloe Point, on gorgonids, 8-10 fathoms; South Bay, Cerros Island, also on gorgonids, 10-15 fathoms.

Suborder **CALYPTOBLASTEAE**

Family **Bonneviellidae**

Genus **BONNEVIELLA**

**Bonneviella minor**, new species

Plate 7, Fig. 26

*Trophosome*.—Zooids arising singly from a loosely spreading stolon, which does not form a very definite network. Pedicels short, not as long as the hydrothecae, without annulations or corrugations. Hydrothecae almost tubular, 1.4 mm. long, 0.5 mm. in diameter, with a distinctly flaring margin. It has much the appearance of that of *B. regia*, but is only about half as long and half as wide.

*Gonosome*.—Not observed.

*Distribution*.—In the channel between Narborough and Albemarle islands, 70 fathoms.

Family **Campanularidae**

Genus **CAMPANULARIA**

?**Campanularia emarginata**, new species

Plate 7, Fig. 27

*Trophosome*.—Zooids arise singly from a stolon that does not form a network; at times, this stolon seems to form a loose fascicle; total height 4 mm., of which the hydrotheca takes 1.1 or 1.2 mm. Pedicels with no annulations except two, immediately proximal to the hydrotheca. Hydrotheca twice, or nearly so, as long as it is broad, cylindrical in its distal half, gradually rounding to the base. Margin with 12 blunt, distinctly cut teeth, each tooth emarginate.

*Gonosome*.—Not observed.

*Distribution*.—On *Antennularia*, La Plata Island, 45-55 fathoms.

?**Campanularia gracilicaulis**, new species

Plate 7, Fig. 28

*Trophosome*.—Individual zooids arise from a meandering stolon, which is slender and smooth; the individual pedicels are long and

slender, up to 5 mm., so that they stand out conspicuously from the supporting surface; they are not annulated directly at the base, but a short distance from the base there are numerous annulations; some distance distal to these there is a smaller number, and two or three near the distal end, next the hydrotheca. Hydrotheca broadly campanulate, with 10 rather shallow, rounded teeth at the margin. Lines run backward from the indentations between the teeth.

*Gonosome*.—Not observed.

*Distribution*.—West of South Seymour Island, 5 fathoms.

### ***Campanularia hincksi* Alder**

*Campanularia hincksi* ALDER, Ann. and Mag. Nat. Hist., (2), XVIII, 1856, p. 360.

HINCKS, Br. Hyd. Zooph., 1868, p. 162.

*Distribution*.—East of islands off Navidad Head, 25-35 fathoms; South Bay, Cerros Island, 10-15 fathoms.

### ***Campanularia urceolata* Clark**

*Campanularia urceolata* CLARK, Alaskan Hyd., 1876, p. 215.

FRASER, Hyd. of Vancouver Island, 1914, p. 140.

*Distribution*.—East of islands off Navidad Head, 25-35 fathoms.

### ***Campanularia volubilis* (Linn.)**

*Sertularia volubilis* LINNAEUS, Syst. Nat., 1767, p. 1311.

*Campanularia volubilis* FRASER, Hyd. of Vancouver Island, 1914, p. 141.

*Distribution*.—Black Beach, low tide; White Friars Islands, 25 fathoms.

## **Genus CLYTIA**

### ***Clytia acutidentata*, new species**

Plate 7, Fig. 29

*Trophosome*.—Colony small, reaching a height of 6 mm., not definitely branched. The stem is geniculate in such a way that each pedicel

in succession seems to terminate the stem, while the offshoot becomes the main stem for the next internode; the angle between the offshoot and the stem is so small that the general direction of the growth of the colony is but little changed. In no case are there more than 7 or 8 zooids in the colony, and there may be only 1 or 2. The main stem has several annulations at the base, the short pedicels are annulated throughout and the larger pedicels, proximally and distally. The hydrotheca is broadly campanulate with 10 acute teeth on the margin. A line runs backward from the tip of each tooth a short distance toward the base of the hydrotheca.

*Gonosome*.—Gonangium arising from the stolon, with little indication of a pedicel, smooth, with a short distal collar.

*Distribution*.—Post Office Bay, on coral at low tide; north of White Friars Islands, on coral in 5 fathoms.

### *Clytia attenuata* (Calkins)

*Campanularia attenuata* CALKINS, Hyd. of Puget Sound, 1899, p. 350.

*Clytia attenuata* FRASER, Hyd. of Vancouver Island, 1914, p. 142.

*Distribution*.—Tagus Cove, on coral at low tide.

### ?*Clytia carinadentata*, new species

Plate 7, Fig. 30

*Trophosome*.—Colony small, slender, 5 mm. high; no branches, not even a continuous stem. The basal portion continues to form the pedicel for the proximal zooid; a short distance proximal to the base of the hydrotheca another stem is given off, forming a pronounced knee at its origin; this continues to form the pedicel of the second zooid, and this may give off a third in the same way, except that the distal portion (in this case, the pedicel for the third zooid) does not give off any stem or pedicel.

The original stem is annulated at the base, a short distance proximal to the point where the next one has its origin, and immediately below the hydrotheca; the intermediate stem is annulated at the base and below the base of the hydrotheca as is the terminal one. The hydrotheca is nearly tubular, 1.0 mm. long, 0.5 mm. wide; the margin is provided with 12-14 acute teeth, each of which is distinctly keeled,

the keel extending backward a short distance toward the base of the hydrotheca.

*Gonosome*.—Not observed.

*Distribution*.—Off the northeast point of Albemarle Island, low tide.

### ***Clytia coronata* (Clarke)**

*Campanularia coronata* CLARKE, Bull. Mus. Comp. Zool., Harvard, 1879, p. 242.

*Clytia coronata* FRASER, Beaufort Hyd., 1912, p. 357.

*Distribution*.—Pacora Island, 15-25 fathoms; Tangola-Tangola, 15-20 fathoms.

### ***Clytia cylindrica* Agassiz**

*Clytia cylindrica* AGASSIZ, Contr. Nat. Hist. U.S., IV, 1862, p. 306.

FRASER, Hyd. of Vancouver Island, 1914, p. 142.

*Distribution*.—Off Clipperton Island, 65 fathoms; off Albemarle Point, on *Sargassum*; Tagus Cove, on corals and sponges at low tide and in 30 fathoms; Black Beach, low tide; San Francisco Bay, 2 fathoms; Pacora Island, 15-25 fathoms; Bahia Honda, 15-25 fathoms; east of islands off Navidad Head, 25-35 fathoms.

### ***Clytia edwardsi* (Nutting)**

*Campanularia edwardsi* NUTTING, Hyd. Woods Hole, 1901, p. 346.

*Clytia edwardsi* FRASER, Hyd. of Vancouver Island, 1914, p. 143.

*Distribution*.—Between Narborough and Albemarle islands, 70 fathoms; Santa Maria Bay, 10 fathoms; off Thurloe Point, 8-10 fathoms.

### ***Clytia fascicularis*, new species**

Plate 7, Fig. 31

*Trophosome*.—Hydrothecae often arising single from a stolon, with a pedicel annulated proximally and distally, but often the pedicels are clustered to form a loose fascicle, with a total height of 5 mm., in which case the part of the pedicel that is free from the fascicle is short

and entirely annulated. Hydrotheca cylindrical, the base broadening to full width immediately as it leaves the pedicel, large, 0.7 mm. by 0.4 mm. The margin is supplied with 10 blunt but deeply cut teeth.

*Gonosome*.—The gonangium is attached to the stolon by a short pedicel; it is obovate, with the distal end truncate; slightly corrugated; 1.0 mm. by 0.4 mm.

*Distribution*.—Santa Elena Bay, 8-12 fathoms; Port Utria, on coral at low tide; Tangola-Tangola, on coral at low tide; east of islands off Navidad Head, 25-35 fathoms; Isabel Island, 10-25 fathoms.

### *Clytia inconspicua* (Forbes)

*Thaumantias inconspicua* FORBES, Br. Naked-eyed Medusae, 1848, p. 52.

*Clytia inconspicua* FRASER, Hyd. of Vancouver Island, 1914, p. 144.

*Distribution*.—Jicarón Island, 15 fathoms.

### *Clytia irregularis*, new species

Plate 8, Fig. 32

*Trophosome*.—Colony, 8 mm., unbranched or slightly branched, sometimes slightly fascicled toward the base; each branch similar to a portion of the main stem. Hydrothecae given off irregularly, with a decided "knee" on the pedicel as it leaves the stem. Pedicels vary much in length; the short ones may be annulated throughout, but the longer ones are partly free from annulations, there being more of them toward the distal than toward the proximal end; annulations on the main stem just distal to the node. Hydrotheca approximately one third longer than wide, definitely campanulate; margin with 12 deeply incised, sharp teeth.

*Gonosome*.—Gonangia single or in pairs, given off from the main stem or branch, at the node; the base tapers to a point and it can scarcely be said that there is a pedicel. There is an increase in diameter until a constriction is reached just below the margin. The whole gonangium, which is smooth, may be regularly and distinctly curved; the distal end is truncated, with a small opening centrally placed. The medusa-buds are somewhat longer than broad.

*Distribution*.—Tangola-Tangola, on coral slightly below low tide; off White Friars, in 5-10 and in 25 fathoms.



**Clytia johnstoni** (Alder)

*Campanularia johnstoni* ALDER, Ann. and Mag. Nat. Hist., (2), XVIII, 1856, p. 359.

*Clytia johnstoni* HINCKS, Br. Hyd. Zoophytes, 1868, p. 143.

*Distribution*.—Gorgona Island, low tide; Tangola-Tangola, on coral at low tide; east of islands off Navidad Head, 25-35 fathoms.

**Clytia kincaidi** (Nutting)

*Campanularia kincaidi* NUTTING, Hyd. of Alaska and Puget Sound, 1899, p. 743.

*Clytia kincaidi* FRASER, Hyd. of Vancouver Island, 1914, p. 146.

*Distribution*.—Wenman Island, low tide; Tagus Cove, 30 fathoms; between Narborough and Albemarle islands, 70 fathoms; between Charles and Indefatigable islands, 60 fathoms; Tangola-Tangola, 15-20 fathoms; north of White Friars, 25 fathoms; off Tenacatita Point, 10 fathoms; east of islands off Navidad Head, 25-35 fathoms.

**Clytia longicyatha** (Allman)

*Obelia longicyatha* ALLMAN, Mem. Mus. Comp. Zool., Harvard, 1877, p. 10.

*Clytia longicyatha* FRASER, Beaufort Hyd., 1912, p. 359.

*Distribution*.—Port Utria, 20 fathoms; Jicaron Island, 25-30 fathoms; Secas Islands, 15 fathoms; Tangola-Tangola, 15-20 fathoms; Isabel Island, 10-25 fathoms; Santa Maria Bay, 35-40 fathoms; South Bay, Cerros Island, 10-15 fathoms.

**Clytia longithecra** Fraser

*Clytia longithecra* FRASER, Hyd. of Vancouver Island, 1914, p. 137.

*Distribution*.—Tangola-Tangola, 15-20 fathoms.

**?Clytia multidentata**, new species

Plate 8, Fig. 33

*Trophosome*.—Individual zooids grow in a loose cluster; pedicels 2.5 mm. long; annulations at the base of the hydrotheca, otherwise smooth. Hydrotheca gradually increasing in diameter from base to

margin; length 1.0 mm., greatest breadth 0.5 mm.; margin with 16-18 slender, blunt, deeply cut teeth; distinct lines running backward from the spaces between the teeth.

*Gonosome*.—Not observed.

*Distribution*.—Port Utria, 20 fathoms.

### ***Clytia raridentata* (Alder)**

Plate 8, Fig. 34

*Campanularia raridentata* ALDER, Ann. and Mag. Nat. Hist. (3), IX, 1862, p. 315.

FRASER, Hyd. of Vancouver Island, 1914, p. 138.

*Trophosome*.—Stems unbranched, serving for the pedicels of the hydranths, arising from a stolon, which at this point has a distinct elevation, somewhat bulbous in appearance; pedicel annulated at the base and below the hydrotheca and sometimes more or less throughout. Hydrotheca long and narrow, tapering slightly from margin to base; teeth usually 5 in number, deep and rounded at the tip.

*Gonosome*.—(Not previously described.) Gonangium arising from the stolon, with scarcely any pedicel; from the base it increases in diameter gradually toward the middle and then decreases almost imperceptibly until it suddenly enlarges at the distal end to form a definite flare, truncated, without a collar. The opening is about half of the diameter of the distal end; surface smooth.

*Distribution*.—Braithwaite Bay, 16-18 fathoms; Tangola-Tangola, at low tide and in 15-20 fathoms.

### **? *Clytia seriata*, new species**

Plate 8, Fig. 35

*Trophosome*.—Colony 20 mm., usually unbranched, consisting of a series of zooids—8 in the colony described—rather than a stem, from which zooids are given off at intervals. The pedicel of each zooid, with the exception of the basal, has its origin a short distance below the hydrotheca of the zooid immediately preceding it, with a definite "knee" at the base, so that the successive pedicels are not far from being in a straight line; the pedicel has several annulations, proximally and distally. Occasionally a colony appears with a branch given off in much the same way as the pedicel, and it continues in a similar way to the

main portion. The hydrotheca is situated like an inverted, truncated cone, with a very evident diaphragm; margin entire.

*Gonosome*.—Gonangium arising from near the middle of a pedicel, with scarcely any pedicel of its own, but turning to pass in the same direction as the hydranth pedicel; elongated, obovate, rounded at the distal end, without a terminal collar. The only gonangium observed was empty.

*Distribution*.—Tangola-Tangola, near shore in 15-20 fathoms.

### Genus EUCOPELLA

#### *Eucopella everta* (Clark)

*Campanularia everta* CLARK, Hyd. of the Pacific Coast, 1876, p. 253.

*Eucopella everta* FRASER, West Coast Hyd., 1911, p. 37.

*Distribution*.—Thurloe Point, 8-10 fathoms; South Bay, Cerros Island, 10-15 fathoms.

#### *Eucopella minor*, new species

Plate 8, Fig. 36

*Trophosome*.—Zooids arising singly from a stoloniferous network; height 1.0 mm., the pedicel 0.6 mm., and the hydrotheca 0.4 mm. Pedicel corrugated or slightly annulated throughout; a distinctly spherical portion appears directly below the hydrotheca. Hydrotheca with thick wall, width 0.3 mm., scarcely flaring, nearly tubular, with 12 low, rounded teeth forming a crenate margin.

*Gonosome*.—Gonangium arising directly from the stolon with a short pedicel, 1.25 mm. by 0.6 mm., nearly smooth, slightly obovate, with the distal end truncate. One large medusoid structure occupies most of the space within; in some cases, an indication of a second one appears.

*Distribution*.—Santa Elena Bay, on floating *Sargassum*.

### Genus GONOTHYRAEA

#### *Gonothyraea clarki* (Marktanner)

*Laomedea (Gonothyraea) clarki* MARKTANNER-TURNERESCHER, Hyd. von Ost Spitzbergen, 1895, p. 408.

*Gonothyraea clarki* FRASER, Hyd. of Vancouver Island, 1914, p. 148.

*Distribution*.—South of Clarion Island, 50 fathoms.

**Gonothyraea gracilis** (Sars)

*Laomedea gracilis* SARS, Beretning om en Zool. Reise i Lofoten og Finmarken, 1851, p. 18.

*Gonothyraea gracilis* FRASER, Hyd. of Vancouver Island, 1914, p. 148.

*Distribution*.—Braithwaite Bay, 30 fathoms; Tagus Cove, 30 fathoms; Post Office Bay, 10-15 fathoms; James Bay, 50-70 fathoms; Cartago Bay, 32 fathoms; between Charles and Indefatigable islands, 60 fathoms; La Plata Island, 45-55 fathoms; Port Utria, 15-20 fathoms; Tangola-Tangola, 15-20 fathoms; off White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms; Isabel Island, 10-25 fathoms.

**Gonothyraea serialis**, new species

Plate 8, Fig. 37

*Trophosome*.—Zooids arising singly from the stolon, or with a succession of three or four, the second arising from the pedicel of the first, the third arising from the pedicel of the second, et cetera, in each case, somewhat nearer the distal end than the proximal; highest colony observed, 6 mm. Each pedicel has several annulations at or near each end; each pedicel forms a definite "knee" at its origin. The diameter of the hydrotheca gradually becomes greater from base to margin; length 0.7 to 0.75 mm., breadth 0.4 mm. Margin with 12 sharp teeth, distinctly but not deeply cut; each tooth has a distinct ridge which continues back on the hydrotheca as a distinct line.

*Gonosome*.—Gonangia arising from the axils of the pedicels, or from the stolon, with a short pedicel which has one or two annulations; obovate, truncate, with a narrow but distinct collar.

*Distribution*.—On a *Lytocarpus* stem at low tide, Port Utria; Bahia Honda, 15-25 fathoms.

**Genus OBELIA****Obelia alternata**, new species

Plate 8, Fig. 38

*Trophosome*.—Colony small and delicate, with a maximum length of 5 or 6 mm., most of the colonies much shorter than this. Stem flexuous, alternating to the one side and the other; very occasionally there is a single branch; the pedicel of each hydrotheca appears to be a continuation of the preceding internode of the stem, bending outward or



even slightly backward in the distal portion; two or three annulations at the base of each internode; pedicels, except the terminal one that is annulated at each end, are annulated throughout. Hydrotheca small, broadly campanulate, slightly flaring at the margin, which is supplied with 10 rounded, comparatively shallow teeth.

*Gonosome*.—Gonangia arising from the axils of the hydrothecal pedicels, obovate, with a terminal opening but without a definite collar.

*Distribution*.—Post Office Bay, 12-15 fathoms; west of South Seymour Island, 5 fathoms.

This species resembles *O. dichotoma* in its mode of growth, but the colonies are, in general, much smaller, and the hydrothecae are quite dissimilar.

### ***Obelia articulata* (A. Agassiz)**

*Eucope articulata* A. AGASSIZ, N. A. Acalephae, 1865, p. 89.

*Obelia articulata* FRASER, Hyd. of Eastern Canada, 1918, p. 348.

*Distribution*.—Between Charles and Indefatigable islands, 60 fathoms.

### ***Obelia commissuralis* McCrady**

*Obelia commissuralis* MCCRADY, Gymno. Charleston Har., 1859, p. 95.  
NUTTING, American Hyd., Part III, 1915, p. 83.

*Distribution*.—Bahia Honda, 15-25 fathoms; Tangola-Tangola, 15-20 fathoms.

### ***Obelia dichotoma* (Linn.)**

*Sertularia dichotoma* LINNAEUS, Syst. Nat., 1758, p. 812.

*Obelia dichotoma* HINCKS, Br. Hyd. Zoophytes, 1868, p. 156.

*Distribution*.—Tagus Cove, on coral and sponges at low tide; Santa Elena Bay, on drifting *Sargassum*; Tangola-Tangola, 15-20 fathoms; north of White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms.

### ***Obelia equilateralis*, new species**

Plate 9, Fig. 39

*Trophosome*.—Colony small, simple, unbranched, reaching a height of 6 or 7 mm. Stem irregularly geniculate, annulated at the proximal end of the internodes. Hydrothecae irregularly arranged on long pedi-



cels that are annulated below the base of the hydrothecae and sometimes at the proximal end as well. Hydrothecae, in face view, almost equilaterally triangular. Margin entire, without flare.

*Gonosome*.—Gonangium large, 1.4 mm. long, growing directly from the stem between the nodes; smooth, elliptical or slightly obovate; opening small, terminal; no collar.

*Distribution*.—Santa Elena Bay, 8-12 fathoms.

### *Obelia geniculata* (Linn.)

*Sertularia geniculata* LINNAEUS, Syst. Nat., 1767, p. 1312.

*Obelia geniculata* HINCKS, Br. Hyd. Zoophytes, 1868, p. 149.

*Distribution*.—Braithwaite Bay, 16-18 fathoms; Tagus Cove, low tide; reef north of the entrance to Tagus Cove, low tide.

### *Obelia hyalina* Clarke

*Obelia hyalina* CLARKE, Bull. Mus. Comp. Zool., Harvard, 1879, p. 241.

FRASER, Beaufort Hyd., 1912, p. 363.

*Distribution*.—East of islands off Navidad Head, 25-35 fathoms; Santa Maria Bay, 10 fathoms; Thurloe Point, low tide; South Bay, Cerros Island, 10-15 fathoms.

### *Obelia microtheca*, new species

Plate 9, Fig. 40

*Trophosome*.—Colony small, slender, reaching a height of 4 mm., but usually much less. Hydrothecae quite regularly alternate, with a tendency to geniculation. Pedicels 1-2 times as long as the hydrothecae. Stem annulated above the origin of each pedicel; pedicel annulated in at least the distal half. Hydrothecae nearly equal in breadth and length; small, 0.2 mm. Margin entire.

*Gonosome*.—Gonangium resembling that of *O. dichotoma*, arising with a short pedicel from the axil of the hydrothecal pedicel, 0.5-0.6 mm. in total length; a definite collar much smaller than the distal portion of the gonangium.

*Distribution*.—Santa Elena Bay, 10 fathoms.

**Obelia obtusidens** (Jäderholm)

Plate 9, Fig. 41

*Campanularia obtusidens* JÄDERHOLM, Hyd. aus den Küsten von Chile, 1904, p. 2.

*Trophosome*.—Colony simple, reaching a height of 3 cm. Stem slightly geniculate; in larger colonies there are regularly alternating branches, in smaller colonies there may be none. Stem quite extensively annulated in the proximal portion of each internode; short pedicels annulated throughout, longer ones, in proximal and distal portions. Hydrothecae broadly campanulate, almost as broad as long; margin with 12 low, rounded teeth; lines pass backward along the hydrothecae from the indentations.

*Gonosome*.—(Not previously described.) Gonangium arising directly from the stolon, with a short pedicel, not annulated, smooth, broad at the distal end and tapering rather rapidly at the proximal end. There is a distinct collar. Length 0.75 mm., greatest breadth 0.2 mm.

*Distribution*.—Santa Elena Bay, 10-12 fathoms.

**Obelia plicata** Hincks

*Obelia plicata* HINCKS, Br. Hyd. Zoophytes, 1868, p. 154.

FRASER, Hyd. of Vancouver Island, 1914, p. 154.

*Distribution*.—South of Clarion Island, 50 fathoms; James Bay, 50-70 fathoms; Cartago Bay, 32 fathoms; between Charles and Indefatigable islands, 60 fathoms; La Plata Island, 45-55 fathoms; Gorgona Island, 20 and 150 fathoms; Port Utria, 40 fathoms; Jicarón Island, 25-30 fathoms; Pacora Island, 15-25 fathoms; Santa Maria Bay, 35-40 fathoms.

**Obelia tenuis**, new species

Plate 9, Fig. 42

*Trophosome*.—Colony small; sometimes there is a single hydrotheca and pedicel but usually there is a short geniculate stem, giving off up to four hydrothecae in which case it may reach a height of 2 mm. The hydrotheca is borne on a short, annulated, or partly annulated pedicel (the internodes of the stem are annulated toward the proximal end); it appears to be an elongation of the pedicel, broadening gradually but not extensively to the margin; the margin has 8 rounded teeth; defi-

nite lines run from the indentations between the teeth backward toward the base.

*Gonosome*.—Gonangia arising singly or in pairs from the hydrothecal axils, small and slender for their length, 0.7 mm. long, 0.1 mm. in diameter, tubular, some of them with a definite collar at the distal end. The distal half may be slightly annulated or corrugated. The blastostyle is present in the basal portion only; the medusa-buds are liberated from the end of this to form a single linear series in the gonangium. Medusa with 12 tentacles at time of liberation from the gonangium.

*Distribution*.—Santa Elena Bay, low tide to 12 fathoms; off Morro de Petatlan, 10-15 fathoms; off Tenacatita Point, 10 fathoms; South Bay, Cerros Island, 10-15 fathoms.

### Genus **SILICULARIA**

#### **Silicularia pedunculata** (Jäderholm)

*Campanularia pedunculata* JÄDERHOLM, Archives de Zool. Exper. et Gen. (4), III, 1904, p. vi.

*Silicularia divergens* HARTLAUB, Die Hyd. der magalhaensischen Region, 1905, p. 578.

*Silicularia pedunculata* JÄDERHOLM, Hyd. aus Ant. Meere, 1905, p. 18.

*Distribution*.—It is difficult to believe that this South Georgia and Tierra del Fuego species would inhabit the Secas Islands area, but the trophosome (no gonosome is present in the specimens) agrees so exactly with Jäderholm's description and figures that it is impossible to ignore the resemblance.

### Family **Campanulinidae**

#### Genus **CAMPANULINA**

#### ?**Campanulina ramosa**, new species

Plate 9, Fig. 43

*Trophosome*.—Colony small, largest 7 mm., for the size of it, extensively branched dichotomously; entirely without annulations or with but slight indications of such. Hydrotheca with 10 segments in the operculum.

*Gonosome*.—Not observed.

*Distribution*.—Tagus Cove, 30 fathoms; between Charles and Indefatigable islands, 60 fathoms.

## Genus CUSPIDELLA

*Cuspidella humilis* (Alder)

*Campanularia humilis* ALDER, Trans. Tynes. Nat. F.C., 1863, p. 239.

*Cuspidella humilis* FRASER, Hyd. of Vancouver Island, 1914, p. 159.

*Distribution*.—Port Utria, 40 fathoms; Isabel Island, 10-25 fathoms.

## Genus LOVENELLA

*Lovenella nodosa*, new species

Plate 9, Fig. 44

*Trophosome*.—Stem slender, straight, unbranched, reaching a height of 35 mm. Hydrothecae given off regularly, alternate, gradually getting slightly closer together as they are farther from the base. Two, or occasionally three, nodes between successive hydrothecae near the base, but sometimes only one, just distal to the hydrotheca pedicel, in the distal portion. Pedicels longer near the base, with several annulations that look like nodes, shorter in the distal portion, with only one annulation. Hydrotheca turbinate, large, over 1.0 mm. in length from the base of the operculum to the base of the hydrotheca, 0.5 mm. wide at the base of the operculum; operculum of 8 segments, 0.4 mm. in length. Hydranth with 14-15 tentacles.

*Gonosome*.—Gonangia arising from the pedicel of the hydrotheca, with a short pedicel, having one annulation; slender, almost tubular, but tapering slightly to the base; reaching slightly beyond the base of the operculum of the corresponding hydrotheca; truncated at the distal end. Six developing medusoids within the gonangium.

*Distribution*.—Santa Elena Bay, 7-8 fathoms; off Morro de Petatlan, 25 fathoms; off Tenacatita Point, 10 fathoms; Isabel Island, 10-25 fathoms; off Thurloe Point, 30 fathoms.

*Lovenella producta* (Sars)

*Calycella producta* SARS, Norges Hydroider, 1873, p. 30.

*Lovenella producta* FRASER, Hyd. of Vancouver Island, 1914, p. 159.

*Distribution*.—La Plata Island, 45-55 fathoms.

This species closely resembles *Egmundella gracilis* Stechow but has none of the nematophores that are present in that species.

Family **Halecidae**Genus **ENDOTHECIUM****Endothecium reduplicatum** Fraser

*Endothecium reduplicatum* FRASER, Some Japanese Hyd., 1935, p. 107.

*Distribution*.—Bahia Honda, 15-25 fathoms; off White Friars, 25 fathoms.

Genus **HALECIUM****Halecium articulatum** Clark

*Halecium articulatum* CLARK, New England Hydroids, 1876, p. 63.

FRASER, Hyd. of Vancouver Island, 1914, p. 164.

*Distribution*.—South Bay, Cerros Island, 10-15 fathoms.

**Halecium beani** (Johnston)

*Thoa beani* JOHNSTON, Br. Zoophytes, 1847, p. 120.

*Halecium beani* HINCKS, Br. Hyd. Zoophytes, 1868, p. 224.

*Distribution*.—Tagus Cove, 30 fathoms; James Bay, 50-70 fathoms; between Charles and Indefatigable islands, 60 fathoms; off Black Beach, 25-40 fathoms; Gardner Bay, 25-35 fathoms; Santa Elena Bay, 10-12 fathoms; San Francisco Bay, 2 fathoms; Tangola-Tangola, 15-20 fathoms; off White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms.

**Halecium bermudense** Congdon

*Halecium bermudense* CONGDON, Hyd. of Bermuda, 1907, p. 473.

FRASER, Beaufort Hyd., 1912, p. 367.

*Distribution*.—Between Charles and Indefatigable islands, 60 fathoms.

**Halecium corrugatum** Nutting

*Halecium corrugatum* NUTTING, Hyd. from Alaska and Puget Sound, 1899, p. 745.

FRASER, Hyd. of Vancouver Island, 1914, p. 164.

*Distribution*.—Santa Maria Bay, in 10 fathoms and in 35-40 fathoms.



***Halecium fasciculatum*, new species**

Plate 10, Fig. 45

*Trophosome*.—Colony 30 mm.; main stem and larger branches fascicled for some distance; branches few and irregularly placed; simple portion of stem and branches strongly geniculate. Each internode seems to terminate in a hydrophore, which is often reduplicated; the succeeding internode is given off near the distal end, and it, in turn, ends in a hydrophore; this is continued throughout the whole length. There are two annulations at the proximal end of each internode. The rim of the hydrophore is distinctly flaring. Several of the hydrophore pedicels have a large circular opening just proximal to the hydrophore.

*Gonosome*.—Gonangium arising by a short, stout pedicel, from the hydrophore pedicel, is broadly lenticular. Each side of the lens is strongly marked by 5 longitudinal corrugations. (The contents of the gonangia were not in good enough condition to determine the sex.)

*Distribution*.—Between Charles and Indefatigable islands, 60 fathoms.

***Halecium flabellatum* Fraser**

*Halecium flabellatum* FRASER, Some Japanese Hyd., 1935, p. 108.

*Distribution*.—Tangola-Tangola, 15-20 fathoms.

These specimens agree entirely with the specimens from Japan except that the gonangia are devoid of terminal nodules.

***Halecium gracile* Verrill**

*Halecium gracile* VERRILL, Invert. An. Vineyard Sound, 1874, p. 729.

NUTTING, Hyd. Woods Hole, 1901, p. 358.

*Distribution*.—Bahia Honda, low tide; South Viradores Islands, 8-10 fathoms; off White Friars, 25 fathoms, and in 5-10 fathoms.

***Halecium halecinum* (Linn.)**

*Sertularia halecina* LINNAEUS, Syst. Nat., 1767, p. 1308.

*Halecium halecinum* FRASER, Hyd. of Vancouver Island, 1914, p. 165.

*Distribution*.—San Francisco Bay, 3-8 fathoms; Tangola-Tangola, 15-20 fathoms; Isabel Island, 10-25 fathoms.

**Halecium insolens**, new species

Plate 10, Fig. 46

*Trophosome*.—Colony minute, slender, up to 1.5 mm. in height, growing from a loose stoloniferous network. There may be a single hydrophore with a rather long pedicel, but in most cases others have been added. The second pedicel grows from the first just below the hydrophore and, near its base, turns so that it is almost in the same direction as the first; the third pedicel bears a similar relation to the second, and there may be four or five in the same one-sided series, for each in succession appears on the same side as the previous one, although there may be a little spiral twisting. Occasionally one or more branches are given off, but these are all also on the one side of the stem. There are one or two annulations at the base of each pedicel, and sometimes also in the course of the longer pedicels. The hydrophore is but slightly everted.

*Gonosome*.—The gonangium (only the female gonangia were observed) is unusual in appearance for a *Halecium* species. It is obovate, 0.5 mm. in length, almost sessile and distinctly corrugated. The opening is on the side about one third of the length of the pedicel from the distal end; it is on the terminus of a small hydrophore-like structure but no zooids were observed in the opening.

*Distribution*.—Isabel Island, 15-25 fathoms.

**Halecium nanum** Alder

*Halecium nanum* ALDER, Ann. and Mag. Nat. Hist. (3), III, 1859, p. 355.

FRASER, Beaufort Hyd., 1912, p. 367.

*Distribution*.—South Viradores Islands, 8-10 fathoms.

**Halecium regulare**, new species

Plate 10, Fig. 47

*Trophosome*.—Colony minute, slender, 5 mm., growing from a stolon that forms a loose network; branches few or absent, similar to the main stem. Stem zigzag, two or three nodes between the first hydrophore and the base of the stem; in all other cases, there is a hydrophore to each internode. Hydrophore sessile, the margin even with the node, expanding to the margin but not definitely flaring.

*Gonosome*.—Not observed.

*Distribution*.—Jicaron Island, 15 fathoms; north of White Friars, 5-10 fathoms; east of islands off Navidad Head, 25-35 fathoms.

The colony bears some resemblance to *H. articulatum* Clark but is a much smaller species.

### ***Halecium tenellum* Hincks**

*Halecium tenellum* HINCKS, Ann. and Mag. Nat. Hist. (3), VIII, 1861, p. 252.

FRASER, Hyd. of Vancouver Island, 1914, p. 169.

*Distribution*.—North of Wenman Island, 100-150 fathoms; Black Beach, at low tide; Post Office Bay, 12-15 fathoms; James Bay, 50-70 fathoms; Cartago Bay, 32 fathoms; between Charles and Indefatigable islands, 60 fathoms; off Black Beach, 25-40 fathoms; Secas Islands, 25 fathoms; White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms.

### ***Halecium tortum*, new species**

Plate 10, Fig. 48

*Trophosome*.—(No complete colony obtained.) Main stem and larger branches strongly fascicled; smaller branches simple, slender, sometimes again branched. Each branch is more in the nature of hydrophore pedicels than a continuous series of internodes; each pedicel, except the proximal, arises from the preceding one at a point just below the hydrophore. The hydrophores are somewhat alternately arranged, but as they are not all in the same plane they may have a decided spiral twist; rim of hydrophore scarcely flaring.

*Gonosome*.—Not observed.

*Distribution*.—East of islands off Navidad Head, 25-35 fathoms.

### ***Halecium vagans*, new species**

Plate 10, Fig. 49

*Trophosome*.—Slender, somewhat straggling colony, 13 mm. high, branching irregular, with a tendency to dichotomy. Internodes of stem long and slender, commonly with a double annulation at the node, the sessile hydrophore being just below the annulation. Branches give off immediately below the hydrophore, either singly or in pairs, to give the

dichotomous effect. When a hydrophore terminates a branch, the pedicel is of considerable length, otherwise it is sessile. Hydrophore scarcely flaring.

*Gonosome*.—Not observed.

*Distribution*.—South of La Plata Island, 45-55 fathoms; San Francisco Bay, 3-8 fathoms; Pacora Island, 15-25 fathoms; Secas Islands, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms.

This species bears some resemblance to *H. tenellum*, but the stem and branches are much less annulated or wrinkled, the cauline hydrophores are sessile and they lack the strong flare so evident in *H. tenellum*.

### ***Halecium washingtoni* Nutting**

*Halecium geniculatum* NUTTING, Hyd. of Alaska and Puget Sound, 1899, p. 744.

*Halecium washingtoni* NUTTING, Am. Nat., XXXIV, 1901, p. 789.  
FRASER, Hyd. of Vancouver Island, 1914, p. 169.

*Distribution*.—In the channel between Narborough and Albemarle islands, 70 fathoms; Thurloe Point, 8-10 and 30 fathoms; South Bay, Cerros Island, 10-15 fathoms.

### **Genus OPHIODISSA**

#### ***Ophiodissa laxa*, new species**

Plate 10, Fig. 50

*Trophosome*.—Colonies clustered, 15 mm.; stem strongly geniculate or somewhat dichotomously arranged. Each portion of the stem that corresponds to an internode in the regular type is slender, much elongated, and much the same size throughout, with one or two annulations at the base given off a short distance below the hydrophore of the preceding portion. There may be another hydrophore or branch given off from the opposite side, to give the dichotomous effect. The hydrophore is definitely flaring.

Tentacular organs large, tubular, commonly one from each pedicel or internodal portion of the stem.

*Gonosome*.—Not observed.

*Distribution*.—Secas Islands, 15 and 25 fathoms.



**Ophiodissa negligens**, new species

Plate 11, Fig. 51

*Trophosome*.—Colony small, 4 mm. high; stem geniculate, with each part in succession arising from the distal portion of the previous part, just below the hydrophore that terminates the part, or sometimes, dichotomous, where two such portions are given off opposite to each other, or the one part may divide dichotomously. Pedicel gradually increasing in diameter and almost insensibly passing into the hydrophore, which is not flaring. There is very little indication of annulation anywhere.

Tentacular organs large, shaped like the hydrophores with their pedicels; commonly one from each pedicel or portion of the stem.

*Gonosome*.—Not observed.

*Distribution*.—Port Utria, 40 fathoms, in 15 fathoms, and on coral at low tide.

Family **Hebellidae**Genus **HEBELLA****Hebella calcarata** (A. Agassiz)

*Lafoea calcarata* A. AGASSIZ, N. A. Acalephae, 1865, p. 122.

*Hebella calcarata* FRASER, Beaufort Hyd., 1912, p. 371.

*Distribution*.—Secas Islands, 25 fathoms; White Friars, 25 fathoms and 5-10 fathoms; Isabel Island, 10-25 fathoms.

Genus **SCANDIA****Scandia corrugata**, new species

Plate 11, Fig. 52

*Trophosome*.—Individual zooids growing from a delicate stolon, creeping over *Synthecium*; each pedicel very short but distinct, making an acute angle with the stolon. Hydrotheca nearly tubular, narrowing suddenly at the base and truncated distally, but the distal end may flare slightly; surface slightly but regularly corrugated; margin entire.

*Gonosome*.—Gonangium small, growing at regular intervals from the stolon; shorter than the hydrotheca; broadly oval, narrowing distally to form a distinct neck; surface corrugated.

*Distribution*.—White Friars Islands, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms.



**Scandia mutabilis** (Ritchie)

*Campanularia mutabilis* RITCHIE, Hyd. from Cape de Verde Is., 1907, p. 504.

*Scandia mutabilis* FRASER, Beaufort Hyd., 1912, p. 372.

*Distribution*.—North of Wenman Island, low tide; Tagus Cove, 30 fathoms; Black Beach, low tide; San Francisco Bay, 2 fathoms; Santa Maria Bay, 10 fathoms.

Family **Lafoeidae**Genus **FILELLUM****Filellum serpens** (Hassall)

*Campanularia serpens* HASSALL, Trans. Micr. Soc., 1852, p. 163.

*Filellum serpens* FRASER, Hyd. of Vancouver Island, 1914, p. 172.

*Distribution*.—Post Office Bay, 12-15 fathoms; James Bay, 20 fathoms, and 50-70 fathoms; Gardner Bay, 25-35 fathoms; Santa Elena Bay, 10-12 fathoms; Jicarón Island, 25-30 fathoms; Pacora Island, 15-25 fathoms; Secas Islands, 15 and 25 fathoms; Tangola-Tangola, 15-25 fathoms; White Friars Islands, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms; Thurløe Point, 30 fathoms.

Genus **LAFOEA****Lafoea intermedia**, new species

Plate 11, Fig. 53

*Trophosome*.—Stem and portions of the principal branches fascicled; branches not numerous, irregularly arranged, making an angle of nearly 90° with the stem. Hydrotheca tubular, tapering to the base, but little curved; pedicels with one or two slight twists, coming out from the stem at an angle that is usually nearly 90°, but may be considerably less, near the tip of the branch.

*Gonosome*.—Coppinia mass elongate, elliptical, with the separate gonangia but rarely hexagonal; they are much more often nearly circular in cross section, not regularly arranged. Each gonangium with a distinct collar, much less in diameter than the main portion of the gonangium. The hydrothecal tubes are not numerous but they vary much in size and length.

*Distribution*.—North of Wenman Island, 100-150 fathoms; James Bay, 50-70 fathoms; Cartago Bay, 32 fathoms; between Charles and Indefatigable islands, 60 fathoms; east of islands off Navidad Head, 25-35 fathoms.

This species appears to be intermediate between *L. gracillima* and *L. fruticosa*. The shape of the hydrotheca and its pedicel and the nature of the coppinia mass bear considerable resemblance to *L. gracillima*, while the mode of branching and the angle that the hydrotheca makes with the branch resemble *L. fruticosa*. The size of the hydrotheca in *L. gracillima* varies much but, in general, that of *L. intermedia* is intermediate between that of *L. gracillima* and *L. fruticosa*. The hydrothecal tubes of *L. intermedia* are quite characteristic, being quite different from those in either of the two species but particularly so when compared with those of *L. fruticosa*.

### Genus LICTORELLA

#### *Lictorella adhaerens*, new species

Plate 11, Fig. 54

*Trophosome*.—Main stem strongly fascicled, rigid, 50 mm.; the individual tubes slender. Few hydrothecae and nematophores on the stem. Branches slender as compared with the stem but, like it, rigid; arranged in subopposite pairs, each making almost a right angle with the stem. Some of the branches are fascicled slightly toward the base, but most of them are simple throughout. Hydrothecae with regular alternate arrangement, each with a short pedicel not adhering to the branch, although the hydrotheca itself is adherent in its basal portion; hydrotheca regularly curved, so that the margin is parallel to the branch and some distance from it. Margin commonly reduplicated. A nematophore attached to each pedicel.

*Gonosome*.—Not observed.

*Distribution*.—Between Charles and Indefatigable islands, 120 fathoms.

#### *Lictorella cervicornis* Nutting

*Lictorella cervicornis* NUTTING, Hawaiian Hyd., 1905, p. 934.

FRASER, *Monobrachium parasitum* and other west coast hydroids, 1918, p. 134.

*Distribution*.—North of Wenman Island, 120-150 fathoms; between Charles and Indefatigable islands, 60 fathoms.

Family **Synthecidae**Genus **SYNTHECIUM****Synthecium gracile** Fraser

*Synthecium gracile* FRASER, Johnson-Smithsonian Hyd., 1937, p. 2.

*Distribution*.—Santa Elena Bay, 10-12 fathoms; Port Utria, 20 fathoms; Pacora Island, 15-25 fathoms; White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms; Santa Maria Bay, 10 fathoms; South Bay, Cerros Island, low tide and in 10-15 fathoms.

**Synthecium projectum**, new species

Plate 11, Fig. 55

*Trophosome*.—Short, stout, unbranched colonies arise from a stolon, 10 mm. high. The stem is divided into rather long internodes by slightly oblique nodes. There is one hydrotheca to each internode, with a regularly alternate arrangement; two successive hydrothecae on the same side are quite distant. Hydrotheca projecting well out from the stem, adhering at the base and about one third of the adcauline side; stout, about half as wide as long, the free portion turning out at an angle of a little more than  $45^\circ$  with the stem. Margin somewhat saddle-shaped, flaring a little.

*Gonosome*.—Not observed.

*Distribution*.—Bahia Honda, 15-25 fathoms; White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms; Santa Maria Bay, low tide; Thurloe Point, 8-10 fathoms; South Bay, Cerros Island, low tide.

**Synthecium rigidum**, new species

Plate 11, Fig. 56

*Trophosome*.—Colony unbranched, straight and rather rigid, 10 mm. high; divided into regular internodes, with one hydrotheca to each, alternating. Hydrotheca nearly as broad as deep, 0.28-0.32 mm., and much the same diameter throughout; adnate from one third to one half of its length. Margin circular, definitely flaring.

*Gonosome*.—Not observed.

*Distribution*.—Santa Elena Bay, 10 fathoms; White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms.

**Synthecium symmetricum**, new species

Plate 12, Fig. 57

*Trophosome*.—Colony slender, 15 mm. high, with pairs of opposite branches given off almost at right angles to the main stem, with no hydrothecae in the axils; no hydrothecae below the proximal branches, and none for some distance above each pair of branches; the pairs between the branches and those on the proximal portion of the branch are more distant than the others. Hydrothecae opposite, each almost tubular, regularly curved so that the distal portion is almost at right angles to the proximal portion; approximately two thirds adherent; about 1.0 mm. in length. Margin entire but slightly and regularly curved.

*Gonosome*.—Gonangia growing out of either one or both of the pairs of hydrothecae at a node; elongated oval, tapering to a narrow neck distally; strongly corrugated.

*Distribution*.—Santa Elena Bay, 10 fathoms; San Francisco Bay, 2-8 fathoms; Port Utria, 20 and 40 fathoms; Jicarón Island, 15 fathoms; Pacora Island, 15-25 fathoms; Secas Islands, 25 fathoms; north of White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms.

Family **Sertularidae**Genus **DIPHASIA****Diphasia paarmani** Nutting

*Diphasia paarmani* NUTTING, Am. Hyd., Part II, 1904, p. 111.

*Distribution*.—Reef north of entrance to Tagus Cove, low tide.

Genus **PASYA****Pasya quadridentata** (Ellis and Solander)

*Sertularia quadridentata* E. and S., Nat. Hist. Zoophytes, 1786, p. 57.

*Pasythea quadridentata* NUTTING, Am. Hyd., Part II, 1904, p. 75.

*Distribution*.—Reef north of entrance to Tagus Cove, low tide; Santa Elena Bay, 5-7 and 10-12 fathoms; La Plata Island, low tide; Pacora Island, 15-25 fathoms; Santa Maria Bay, 10 fathoms; South Bay, Cerros Island, 10-15 fathoms.



Genus **SERTULARELLA****Sertularella ampullacea**, new species

Plate 12, Fig. 58

*Trophosome*.—Colony slender, lax, 7 mm. high, with one or two branches or without branches. What may be considered as the stem consists of a series of long sections, each of which arises from the preceding section, just below its terminal hydrotheca, the proximal portion forming a distinct "knee" bend. When a branch is given off, it appears opposite the section given off in the usual way; annulations at the base of the section faint or absent. Hydrothecae elongated-ovate, the distal portion forming a "neck"; surface strongly and regularly corrugated; margin with four teeth; operculum of four flaps.

*Gonosome*.—Not observed.

*Distribution*.—Port Utria, 15-20 fathoms; Pacora Island, 15-25 fathoms.

**Sertularella conica** Allman

*Sertularella conica* ALLMAN, Hyd. of the Gulf Stream, 1877, p. 21.

NUTTING, Am. Hyd., Part II, 1904, p. 79.

*Distribution*.—South of Clarion Island, 50 fathoms; Tagus Cove, 30 fathoms; James Bay, 50-70 fathoms; Black Beach, 25-40 fathoms; White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms; South Bay, Cerros Island, 10-15 fathoms.

**Sertularella exilis**, new species

Plate 12, Fig. 59

*Trophosome*.—Small, slender, unbranched colonies, 6-12 mm. high, grow from a reticulate stolon. Nodes, indicated but not definite, divide the stem into internodes, each bearing one hydrotheca; hydrothecae alternate, distant. Hydrotheca regularly curved upward and then outward; smooth, much the same diameter throughout. Margin with four, not very distinct, teeth; operculum of four flaps.

*Gonosome*.—Not observed.

*Distribution*.—Bahia Honda, 15-25 fathoms; White Friars, 25 fathoms.



**Sertularella formosa** Fewkes

*Sertularella formosa* FEWKES, Bull. Mus. Comp. Zool., Harvard, VIII, No. 7, 1881, p. 130.

NUTTING, Amer. Hyd., Part II, 1904, p. 104.

*Distribution*.—Santa Elena Bay, 10-12 fathoms; San Francisco Bay, 2 fathoms; Gorgona Island, low tide and in 20 fathoms; Pacora Island, 15-25 fathoms; Secas Islands, 25 fathoms; White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms.

**Sertularella fusiformis** (Hincks)

*Sertularia fusiformis* HINCKS, Ann. and Mag. Nat. Hist. (3), VIII, 1861, p. 253.

*Sertularella fusiformis* NUTTING, Am. Hyd., Part II, 1904, p. 89.

*Distribution*.—North of Wenman Island, low tide; off Albemarle Point, low tide.

**Sertularella incisa**, new species

Plate 12, Fig. 60

*Trophosome*.—Most of the colonies unbranched, less than 2 mm. high, erect, rigid, but not very stout; not very definitely divided into internodes. Hydrothecae regularly alternate, distant; curved regularly outward; about one half of the adcauline side adherent, with thick chitin at the base. Margin with three teeth, two of them more distinct than the third; operculum of three flaps.

When the colony is branched, the short branches may be quite close to each other, on each side. The angle that the branch makes with the stem seems to be continued as a curved incision into the stem, which is characteristic. There is no hydrotheca in the axil.

*Gonosome*.—Not observed.

*Distribution*.—South Bay, Cerros Island, 10-15 fathoms.

**Sertularella rugosa** (Linn.)

*Sertularia rugosa* LINNAEUS, Syst. Nat., 1758, p. 809.

*Sertularella rugosa* HINCKS, Br. Hyd. Zoophytes, 1868, p. 259.

*Distribution*.—Braithwaite Bay, on coral at low tide; Banks Bay, low tide; reef north of entrance to Tagus Cove, low tide; South Seymour Island, low tide; Santa Maria Bay, low tide; Thurloe Point, 8-10 fathoms; South Bay, Cerros Island, low tide.

### ***Sertularella tenella* (Alder)**

*Sertularia tenella* ALDER, Cat. Zooph. Northumberland, 1857, p. 23.

*Sertularella tenella* HINCKS, Br. Hyd. Zoophytes, 1868, p. 242.

*Distribution*.—North of Wenman Island, 100-150 fathoms; Tagus Cove, 30 fathoms; Cartago Bay, 32 fathoms; between Charles and Indefatigable islands, 60 fathoms; Santa Elena Bay, 10-12 fathoms; La Plata Island, 45-55 fathoms; Secas Islands, 25 fathoms.

### ***Sertularella turgida* (Trask)**

*Sertularia turgida* TRASK, Proc. Cal. Acad. Sc., 1857, p. 113.

*Sertularella turgida* NUTTING, Am. Hyd., Part II, 1904, p. 95.

*Distribution*.—Santa Maria Bay, low tide; Thurloe Point, 8-10 fathoms; South Bay, Cerros Island, low tide and in 10-15 fathoms.

## **Genus SERTULARIA**

### ***Sertularia anceps*, new species**

Plate 13, Fig. 61

*Trophosome*.—Colony slender, up to 40 mm., with opposite branches similar to the main stem; sometimes only one of the pairs of branches is developed; stem divided regularly into internodes. Branches given off almost at right angles, a distinct constriction at the base of each. Hydrothecae placed so that the pair is separated almost equally at each margin; no front and back distinction; they are near together for about one third of their length and then turn outward rather abruptly, so that the distal portion of the hydrotheca is nearly at right angles to the stem. Margin with three teeth, operculum with three flaps.

*Gonosome*.—Not observed.

*Distribution*.—Santa Elena Bay, 10 fathoms and on drifting *Sargassum*; Secas Islands, 15 and 25 fathoms; Isabel Island, 10-25 fathoms; off Thurloe Point, 8-10 fathoms; South Bay, Cerros Island, 10-15 fathoms.

**Sertularia cornicina** (McCrary)

*Dynamena cornicina* MCCRADY, Gymno. Charleston Har., 1859, p. 204.

*Sertularia cornicina* NUTTING, Am. Hyd., Part II, 1904, p. 58.

*Distribution*.—North of White Friars, 5-10 fathoms.

**Sertularia desmoides** Torrey

*Sertularia desmoides* TORREY, Hyd. Pac. Coast, 1902, p. 65.

NUTTING, Am. Hyd., Part II, 1904, p. 56.

*Distribution*.—Between Charles and Indefatigable islands, 60 fathoms; off Black Beach, 25-40 fathoms; Tangola-Tangola, low tide; Santa Maria Bay, 10 fathoms.

**Sertularia dispar**, new species

Plate 13, Fig. 62

*Trophosome*.—Colony unbranched, 10 mm. high; stem divided into rather short internodes, on each of which a pair of hydrothecae is nearly medially placed, the pair in contact for a short distance at the base, on the face of the stem, but distinctly separated throughout, on the back of the stem. Hydrothecae stout for their length, tapering distally to a margin with two teeth, placed in such a position that the one flap of the operculum is much larger than the other.

*Gonosome*.—Gonangium arising from the face of the stem, in its proximal portion, from the central part of the internode, nearly at right angles to the stem; 1.2 mm. long, 0.8 mm. in diameter; pedicel short and stout. Gonangium strongly corrugated, distally truncated, with a full sized opening.

*Distribution*.—Santa Elena Bay, 10 fathoms; San Francisco Bay, 2 fathoms; Santa Maria Bay, 10 fathoms; South Bay, Cerros Island, low tide.

**Sertularia exigua** Allman

*Sertularia exigua* ALLMAN, Hyd. Gulf Stream, 1877, p. 24.

FRASER, Jap. Hyd., II, 1936, p. 50.

*Distribution*.—Port Culebra, low tide; Tangola-Tangola, low tide; Santa Maria Bay, 10 fathoms; off Thurloe Point, 8-10 fathoms.

**Sertularia furcata** Trask

*Sertularia furcata* TRASK, Proc. Cal. Acad. Sc., 1857, p. 112.

FRASER, West Coast Hyd., 1911, p. 72.

*Distribution*.—Off Thurloe Point, 8-10 fathoms; South Bay, Cerros Island, low tide and in 10-15 fathoms.

**Sertularia mayeri** Nutting

*Sertularia mayeri* NUTTING, Am. Hyd., Part II, 1904, p. 58.

*Distribution*.—Santa Elena Bay, 5-6 fathoms and 10-12 fathoms; north of White Friars, 5-10 fathoms.

**Sertularia stookeyi** Nutting

*Sertularia stookeyi* NUTTING, Am. Hyd., Part II, 1904, p. 59.

FRASER, Beaufort Hyd., 1912, p. 375.

*Distribution*.—North shore of Wenman Island, low tide; off Albe-marle Point, on floating *Sargassum*; Santa Elena Bay, 5-7 fathoms; San Francisco Bay, 2 fathoms; Pacora Island, 15-25 fathoms; Tangola-Tangola, on coral at low tide; off White Friars, 25 fathoms.

**Sertularia versluysi** Nutting

*Sertularia versluysi* NUTTING, Am. Hyd., Part II, 1904, p. 53.

FRASER, Beaufort Hyd., 1912, p. 375.

*Distribution*.—Tagus Cove, low tide; reef north of entrance to Tagus Cove, low tide.

**Genus THUIARIA****Thuiaria simplex**, new species

Plate 13, Fig. 63

*Trophosome*.—Colony unbranched, slender, 12 mm. high. Stem divided into regular internodes by slightly oblique nodes. Hydrothecae regularly alternating, one to each internode; gradually curved from base to margin; of much the same diameter throughout; margin with two blunt teeth; operculum of two flaps. The distal portion on the

proximal or upper side seems to collapse readily so that many of the hydrothecae have an appearance similar to that of a *Diphasia* hydrotheca.

*Gonosome*.—Not observed.

*Distribution*.—Santa Elena Bay, 10 fathoms; San Francisco Bay, 2 fathoms; Gorgona Island, 5-6 fathoms; east of islands off Navidad Head, 25-35 fathoms; South Bay, Cerros Island, low tide.

### *Thuiaria tubuliformis* (Markt.)

*Dynamena tubuliformis* MARKTANNER-TURNERETSCHER, Hyd. des K. K. Natur. Hofmuseums, 1890, p. 238.

*Thuiaria tubuliformis* NUTTING, Am. Hyd., Part II, 1904, p. 70.

*Distribution*.—North shore of Wenman Island, low tide; Albemarle Point, low tide; Banks Bay, low tide; Narborough Lagoon, low tide; reef north of entrance to Tagus Cove, low tide; South Seymour Island, low tide; Sullivan Bay, low tide; Cartago Bay, low tide; Santa Elena Bay, 10-12 fathoms; Gorgona Island, low tide; Port Utria, low tide; Jicarita Island, low tide; Bahia Honda, low tide; Tangola-Tangola, low tide.

## Family Plumularidae

### Genus AGLAOPHENIA

#### *Aglaophenia diegensis* Torrey

*Aglaophenia diegensis* TORREY, Hyd. of the Pac. Coast, 1902, p. 71.

FRASER, West Coast Hyd., 1911, p. 71.

*Distribution*.—North shore of Wenman Island, low tide; Tagus Cove, 30 fathoms; reef north of entrance to Tagus Cove, low tide; Santa Maria Bay, low tide; South Bay, Cerros Island, 10-15 fathoms.

#### *Aglaophenia inconspicua* Torrey

*Aglaophenia inconspicua* TORREY, Hyd. of Pac. Coast, 1902, p. 71.

*Distribution*.—Near Christopher Point, Albemarle Island, low tide; Black Beach, low tide; Santa Maria Bay, 35-40 fathoms.



**Aglaophenia praecisa, new species**

Plate 13, Fig. 64

*Trophosome*.—Colony small, 12 mm. high, divided into regular internodes, each of which bears a hydrocladium. Hydrocladia nearly in the same plane, given off almost at right angles to the stem. Hydrothecae closely approximated; Margin with 9 teeth, the median sharp, retrorse, but not very markedly so; the first, second, and third pairs, rounded and nearly equal; the fourth pair more slender and sharper. The widest angle lies between the first and second teeth on each side, and the most acute between the median tooth and the first pair. Intrathecal ridges present but not strongly marked; lateral nematophores reaching above the margin of the hydrotheca; median nematophore short, not reaching nearly to the margin of the hydrotheca; the three nematophores on each cauline internode similarly tubular.

*Gonosome*.—Not observed.

*Distribution*.—Santa Maria Bay, 10 fathoms.

**Aglaophenia rigida Allman**

*Aglaophenia rigida* ALLMAN, Hyd. Gulf Stream, 1877, p. 43.

FRASER, Beaufort Hyd., 1912, p. 378.

*Distribution*.—Off White Friars, 25 fathoms; Isabel Island, 10-25 fathoms; Santa Maria Bay, 10 fathoms and 35-40 fathoms.

**Genus ANTENNELLA****Antennella avalonia Torrey**

*Antennella avalonia* TORREY, Hyd. Pac. Coast, 1902, p. 74.

*Distribution*.—East of islands off Navidad Head, 25-35 fathoms.

**Antennella compacta, new species**

Plate 13, Fig. 65

*Trophosome*.—Colony small, 6 or 7 mm.; one or two proximal internodes, long and without hydrothecae, have a varying number of nematophores; the remainder of the hydrocladium is divided into alternating hydrothecate and nonhydrothecate internodes; the hydrothecate internode, with a transverse node proximally and an oblique node dis-

tally, has the usual type of hydrotheca for this genus, with a mesial nematophore just proximal to it (like that of *A. gracilis*), and a pair, one on each side, much larger, with a trumpet-shaped distal section (like those of *A. secundaria*); the nonhydrothecate internode is short and has but one nematophore.

*Gonosome*.—Gonangium, arising from the hydrothecate internode, just proximal to the mesial nematophore, obovate and curved, tapering at the base to a short pedicel; two nematophores where the gonangium joins the pedicel.

*Distribution*.—South Bay, Cerros Island, 10-15 fathoms.

### ***Antennella gracilis* Allman**

*Antennella gracilis* ALLMAN, Hyd. Gulf Stream, 1877, p. 38.

*Distribution*.—South of Clarion Island, 32 fathoms; Secas Islands, 25 fathoms; Tangola-Tangola, 15-20 fathoms; off White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms; Isabel Island, 10-25 fathoms.

## **Genus ANTENNULARIA**

### ***Antennularia alternata*, new species**

Plate 13, Fig. 66

*Trophosome*.—Main stem, 70 mm. long, simple, straight, canaliculated. Hydrocladia given off in two series, one on each side of the stem, in the same plane or almost so; those in the two series regularly alternating with each other. Each hydrocladium arises from a process of the stem, at least half as long as the first internode; each hydrocladial internode bears one cup-shaped hydrotheca near the middle, adhering to the hydrocladium throughout its whole length. The nodes may be transverse or somewhat oblique; no definite septal ridges. Two-chambered nematophores appear on the main stem, usually two between two succeeding hydrocladia on the same side. There is a low, immovable, one-chambered nematophore on a papilla at the base of the hydrocladial process and one movable, two-chambered nematophore farther out on the process; on each internode of the hydrocladium there is a nematophore below the hydrotheca and one, some distance above; two immediately above.

*Gonosome*.—Gonangia appearing in pairs on the more distal hydrocladial processes; concavo-convex, with the concave side toward the stem; shaped like a bent pear.

*Distribution*.—North of Wenman Island, 100-150 fathoms.

This species is a typical Antennularian except for the hydrocladial arrangement, which is as definitely Plumularian. In this it agrees with *Nemertesia disticha* (Heller).

### ***Antennularia irregularis*, new species**

Plate 13, Fig. 67

*Trophosome*.—Colony plumose, 5 cm. high; nodes not regularly placed or well marked. Slender hydrocladia irregularly arranged, on several sides of the stem, proximally, but with a tendency to an opposite arrangement, distally; sometimes regularly alternate, at other times, subopposite. It is difficult to describe the hydrocladia, as no two are quite alike. In some cases the proximal internode is hydrothecate, in others there may be one, two, or even three nonhydrothecate internodes before the first hydrothecate internode; there may be one, two, or three intermediate internodes; all or nearly all of them have a distinct ridge near each end. Each internode bears a mesial nematophore, some of the intermediate internodes, two; there are two supracalcine nematophores. A cauline nematophore is present on the shoulder that bears the hydrocladium and, in some cases, one is present on the medial portion of the internode.

*Gonosome*.—Not observed.

*Distribution*.—South of La Plata Island, 45-55 fathoms.

### ***Antennularia tetraseriata*, new species**

Plate 14, Fig. 68

*Trophosome*.—Stem stout (fragment 2 cm. long), simple, canaliculated with large canals. Hydrocladia in four series, in two opposite pairs, i.e., decussate; each hydrocladium arises from a process of the stem about half of the length of the hydrocladial internode. Each internode bears one shallow hydrotheca, slightly proximal to the middle of the internode; a distinct septal ridge near each end of each internode. Cauline nematophores in line with the hydrocladial processes, two between each two successive hydrocladia, one large nematophore in the

axil of the process; on the process, there is one low one-chambered nematophore and one two-chambered, on the proximal hydrocladial internode; one below the hydrotheca and a pair immediately above it; other internodes usually have two proximal nematophores.

*Gonosome*.—Not observed.

*Distribution*.—South of Clarion Island, 55 fathoms.

### Genus **CLADOCARPUS**

#### **Cladocarpus tortus**, new species

Plate 14, Fig. 69

*Trophosome*.—Stem simple, unbranched, 30 mm. high. A twist in the stem just proximal to the first hydrocladium shows three distinct nodes; otherwise there are no nodes indicated on the stem. Hydrocladia regularly alternate, but not quite in the same plane, the longest 6 mm., each arising from a distinct process of the stem; divided into regular internodes, each of which is almost entirely occupied by a hydrotheca. Hydrotheca much deeper than wide, the margin with a median, small, sharp tooth, lateral to which there are four shallow, rounded teeth, the last one sometimes indented. The supracalcine nematophores do not reach beyond the margin of the hydrotheca; the mesial nematophore projects outward, partly adherent to the hydrotheca, jointed near the base. A septal ridge is present at the base of the supracalcine nematophore, one at the base of the hydrotheca and three between them, but all of them are faint and short. There are two broad nematophores in the axil of the hydrocladial process, one on its face and one a short distance below this in the main stem. On the portion of the stem proximal to the first hydrocladium, there is a row of nematophores, rather close together distally, but more and more distant toward the base.

*Gonosome*.—Not observed.

*Distribution*.—South of La Plata Island, 45-55 fathoms.

### Genus **DIPLOCHEILUS**

#### **Diplocheilus allmani** Torrey

*Diplocheilus allmani* TORREY, Hyd. of San Diego, 1904, p. 36.

FRASER, West Coast Hyd., 1911, p. 81.

*Distribution*.—Santa Maria Bay, low tide; off Thurloe Point, 8-10 fathoms; South Bay, Cerros Island, 10-15 fathoms.



Genus **LYTOCARPUS****Lytocarpus philippinus** (Kirchenpauer)

*Aglaophenia philippina* KIRCHENPAUER, Ueber die Hyd. Fam. Plumularidae, Part I, 1872, p. 45.

*Lytocarpus philippinus* NUTTING, Am. Hyd., Part I, 1900, p. 122.

*Distribution*.—Santa Elena Bay, 5-7 fathoms and 10-12 fathoms; La Plata Island, 10-12 fathoms; San Francisco Bay, 2 fathoms; Gorgona Island, on coral at low tide; Port Utria, on coral at low tide; Bahia Honda, 15-25 fathoms; Secas Islands, 15 and 25 fathoms; South Viradores Islands, 8-10 fathoms; off White Friars, 25 fathoms; off Morro de Petatlan, 25 fathoms; off Tenacatita Point, 10 fathoms; east of islands off Navidad Head, 25-35 fathoms.

Genus **MONOSTAECHAS****Monostaechas quadridens** (McCrady)

*Plumularia quadridens* MCCRADY, Proc. Elliott Soc., 1859, p. 199.

*Monostaechas quadridens* NUTTING, Am. Hyd., Part I, 1900, p. 75.

*Distribution*.—Braithwaite Bay, 16-18 fathoms; south of Clarion Island, 50 fathoms; Black Beach, low tide; San Francisco Bay, 2 and 3-8 fathoms; Port Utria, 15-20 fathoms; Pacora Island, 15-25 fathoms; Secas Islands, 15 fathoms; Tangola-Tangola, 15-20 fathoms; east of islands off Navidad Head, 25-35 fathoms; South Bay, Cerros Island, 10-15 fathoms.

Genus **PLUMULARIA****Plumularia acutifrons**, new species

Plate 14, Fig. 70

*Trophosome*.—Colony small and slender, up to 2 cm. in height, but mostly shorter than this. Stem divided into regular short internodes, each somewhat rounded at each end, giving a constricted appearance to the stem at each node. Each internode bears a hydrocladium near its distal end; the hydrocladia alternate. The hydrocladial process grows rather from the face of the internode than from the lateral surface, the successive hydrocladia being little more than 30° from each other. Each hydrocladium is divided into alternate nonhydrothecate and hydrothecate internodes, the proximal being nonhydrothecate. The nonhydrothecate



are short with a well marked septal ridge; the hydrothecate are relatively long, nearly equal in depth and breadth with the hydrotheca near the distal end; there is a strong septal ridge near each end. There are two supracalcine nematophores and one mesial one on each hydrothecate internode, none on the nonhydrothecate. There is one cauline nematophore on each internode, just distal to the hydrocladial process.

*Gonosome*.—Not observed.

*Distribution*.—Off Thurloe Point, 8-10 fathoms.

### *Plumularia alicia* Torrey

*Plumularia alicia* TORREY, Hyd. Pac. Coast, 1902, p. 75.

TORREY, Hyd. San Diego, 1904, p. 37.

*Distribution*.—South Bay, Cerros Island, low tide.

### *Plumularia alternata* Nutting

Plate 14, Fig. 71

*Plumularia alternata* NUTTING, Am. Hyd., Part I, 1900, p. 62.

FRASER, Beaufort Hyd., 1912, p. 381.

*Trophosome*.—Colony simple, unbranched, 12 mm. Stem geniculate, divided into internodes of which every alternate one bears a hydrotheca and a hydrocladium. Hydrocladia divided into regular internodes, hydrothecate and nonhydrothecate alternating, the proximal one being nonhydrothecate; hydrothecate internodes bounded by oblique nodes proximally and transverse nodes distally. Hydrotheca deeply campanulate, with about one third of the distal portion free. Supracalcine nematophores present, and mesial nematophores on both types of internodes. There is one nematophore on each internode of the stem and one at the axil of the hydrocladium.

*Gonosome*.—(Not previously described.) Gonangia arise in verticils of four just below the bases of the cauline hydrothecae, each gonangium with a short pedicel, with two or three annulations. The gonangium is the shape of a curved cornucopia, enlarging gradually to the distal end, which is almost truncate. Each gonangium bears two nematophores. The blastostyle follows the curve of the gonangium and had a definite enlargement near its distal end.

*Distribution*.—Braithwaite Bay, on coral at low tide; north of Wenman Island, 100-150 fathoms; and at low tide; Black Beach, low

tide; Santa Elena Bay, 8-12 fathoms; Port Utria, on coral at low tide; Jicarita Island, low tide; Pacora Island, 15-25 fathoms; east of islands off Navidad Head, 25-35 fathoms; Isabel Island, 15-25 fathoms.

**Plumularia biarmata**, new species

Plate 14, Fig. 72

*Trophosome*.—Colony with slender stem, 10 mm. high, and long, slender hydrocladia. The stem is divided into regular internodes by distinct nodes; each internode gives off a hydrocladial process near its distal end; the hydrocladia alternating from side to side in the same plane. Hydrocladia bearing as many as 8 hydrothecae; the first internode is short with a transverse node proximally and an oblique one distally; it does not bear a hydrotheca. All the other internodes are hydrothecate. The internode is long and slender and the hydrotheca is situated not far from the distal end. Each internode is rounded at each end, so that the hydrocladium is very slender at the nodes. The hydrotheca is but slightly deeper than wide. On each hydrothecate internode but the first there are two mesial nematophores, one not far from the base and the other near the base of the hydrotheca; the first one has but one; there are two supracalcine nematophores. There is no nematophore on the proximal internode; there is one at the axil of the hydrocladial process and another cauline one, a short distance above it on the next internode.

*Gonosome*.—Not observed.

*Distribution*.—Bahia Honda, 15-25 fathoms; Secas Islands, 15 fathoms; east of islands off Navidad Head, 25-35 fathoms.

**Plumularia corrugata** Nutting

*Plumularia corrugata* NUTTING, Am. Hyd., Part I, 1900, p. 64.

FRASER, Hyd. of Vancouver Island, 1914, p. 205.

*Distribution*.—South Bay, Cerros Island, 10-15 fathoms.

**Plumularia defecta**, new species

Plate 15, Fig. 73

*Trophosome*.—Colony small, 8 mm., simple, unbranched; stem divided into regular internodes by single transverse nodes. Hydrocladia alternate, one to each internode, given off near the distal end; each

hydrocladium with alternating nonhydrothecate and hydrothecate internodes, the proximal being nonhydrothecate; nodes alternately transverse and slightly oblique. Hydrotheca nearly equal in depth and breadth. Two supracalcine nematophores and a mesial on the hydrothecate internode, none on the nonhydrothecate internodes; two nematophores at the axil of the hydrocladium and one on the cauline internode on the side opposite the hydrocladium.

The characteristic feature of the species is the lack of nematophores on the nonhydrothecate internodes.

*Gonosome*.—Not observed.

*Distribution*.—Off La Plata Island, 45-55 fathoms.

### **Plumularia delicata** Nutting

*Plumularia delicata* NUTTING, Hawaiian Hyd., 1905, p. 951.

*Distribution*.—North of Wenman Island, 100-150 fathoms.

### **Plumularia flicula** Allman

*Plumularia flicula* ALLMAN, Hyd. Gulf Stream, 1877, p. 29.

NUTTING, Am. Hyd., Part I, 1900, p. 58.

*Distribution*.—Off La Plata Island, 45-55 fathoms.

### **Plumularia floridana** Nutting

*Plumularia floridana* NUTTING, Am. Hyd., Part I, 1900, p. 59.

*Distribution*.—Albemarle Point, low tide; Santa Elena Bay, on drifting *Sargassum* and in 10-12 fathoms; Pacora Island, 15-25 fathoms; Tangola-Tangola, on coral at low tide.

### **Plumularia inermis** Nutting

Plate 15, Fig. 74

*Plumularia inermis* NUTTING, Am. Hyd., Part I, 1900, p. 62.

FRASER, Beaufort Hyd., 1912, p. 382.

*Trophosome*.—Colony simple, unbranched, 12 mm., divided into long, slender internodes, each of which bears a hydrocladium from a process near the distal end. The hydrocladia are divided into regular internodes, all of which, including the proximal, bear hydrothecae, ex-

cept very occasionally, when there may be an intermediate internode. These internodes are long and slender so that there is a long interval between the successive hydrothecae. Hydrotheca shallow campanulate; supracalycine nematophores absent. There is a nematophore above and one below the hydrotheca and one at the axil of each hydrocladium. Hydranths too large to be entirely retracted into the hydrotheca.

*Gonosome*.—(Not previously described.) Gonangium arising from the hydrocladial process of the stem; elongated obovate, with a very short pedicel; nearly twice as long as the hydrocladial internode.

*Distribution*.—Black Beach, low tide; Post Office Bay, 35-40 fathoms.

### ***Plumularia lagenifera* Allman**

*Plumularia lagenifera* ALLMAN, Proc. Linn. Soc. London, 1885, p. 157.

NUTTING, Am. Hyd., Part I, 1900, p. 65.

FRASER, Hyd. of Vancouver Island, 1914, p. 207.

*Distribution*.—James Bay, 50-70 fathoms; Cartago Bay, 32 fathoms; east of islands off Navidad Head, 25-35 fathoms; Santa Maria Bay, 10 fathoms; off Thurloe Point, 8-10 fathoms; South Bay, Cerros Island, 10-15 fathoms.

### ***Plumularia magellanica* Hartlaub**

Plate 15, Fig. 75

*Plumularia magellanica* HARTLAUB, Magellan Hyd., 1905, p. 684.

*Trophosome*.—Colony rather diminutive, 4 mm. high; main stem erect or slightly geniculate, definitely divided into internodes. From near the distal end of each internode a hydrocladium, if it can be called such, is given off, these regularly alternating and in the same plane. The hydrocladium may consist of a support for a single hydrotheca, or for two or more in a series, the support in each case having one or more nodes present. In each instance where there is more than one hydrotheca in the series, the extra hydrothecae are supported by pedicel-like structures arising from the preceding one, just below the hydrotheca. In each the pedicel or support becomes gradually broader from the proximal to the distal end, where it meets the hydrotheca. There are no nematophores anywhere in the colony.

*Gonosome*.—(Not previously described.) Gonangium arising from the hydrocladial process of the stem, or directly from the internode;



smooth, elongate, obovate, nearly twice as long as the hydrocladial internode.

*Distribution*.—Black Beach, at low tide and in 25-40 fathoms.

This species is so far from being a typical plumularian that it is a question if it should not be placed in a new genus.

### ***Plumularia margaretta* (Nutting)**

*Monothecha margaretta* NUTTING, Am. Hyd., Part I, 1900, p. 72.

*Plumularia margaretta* LELOUP, West Indian Hyd., 1935, p. 54.

*Distribution*.—La Plata Island, 10-12 fathoms.

### ***Plumularia propinqua*, new species**

Plate 15, Fig. 76

*Trophosome*.—Colony slender, 5 cm.; stem simple, divided into regular internodes by well-marked nodes, each bearing a single hydrocladium on a prominent process near the distal end, the hydrocladia alternating from side to side but in the same plane. The first hydrocladial internode is short and does not bear a hydrotheca, but all the other internodes, as many as five, are hydrothecate, each bearing one hydrotheca. The node between the first internode and the first hydrothecate internode is oblique, all the rest are transverse. Hydrotheca nearly equal in depth and breadth, or the depth is slightly greater; septal ridges absent; two supracalycine nematophores and one mesial nematophore on each hydrocladial internode that bears a hydrotheca, one in the axil of the hydrocladium and one medially placed on the cauline internode, on the side opposite the hydrocladial process.

*Gonosomē*.—Gonangia small, not much larger than the hydrothecae; oval, arising from the axils of the hydrocladia, by a short pedicel.

*Distribution*.—Santa Elena Bay, 10-12 fathoms; Gorgona Island, 20 fathoms; Jicaron Island, 25-30 fathoms; Secas Islands, 25 fathoms; Tangola-Tangola, 15-20 fathoms; off White Friars, 25 fathoms; east of islands off Navidad Head, 25-35 fathoms; Isabel Island, 10-25 fathoms.

### ***Plumularia setacea* (Ellis)**

*Corallina setacea* ELLIS, Nat. Hist. Corallines, 1755, p. 19.

*Plumularia setacea* HINCKS, Br. Hyd. Zoophytes, 1868, p. 296.

*Distribution*.—South of Clarion Island, 50 fathoms; north of Wenman Island, low tide; Albemarle Point, low tide; Black Beach, low tide; between Charles and Indefatigable islands, 60 fathoms.



**Plumularia sinuosa**, new species

Plate 15, Fig. 77

*Trophosome*.—Colony small, slender, 10-12 mm.; stem sinuous. The distal end of each internode is furcate, one portion continues as the next cauline internode and the other as a hydrocladium; these alternate from side to side. The hydrocladium consists of alternating non-hydrothecate and hydrothecate internodes, the proximal, a short one, being without a hydrotheca. The nonhydrothecate internode has a transverse node proximally and an oblique node distally, the hydrothecate internode, the reverse. The hydrotheca is deeply cup-shaped, centrally placed, with its margin free from the surface of the internode. On each cauline internode there is a nematophore at the angle of bifurcation, and one almost centrally placed on the side away from the hydrocladium; there is no nematophore on the proximal hydrocladial internode, but there is one on each of the other nonhydrothecate internodes; on each hydrothecate internode there is a nematophore proximal to the hydrotheca and two nematophores overtopping the hydrotheca.

*Gonosome*.—Not observed.

*Distribution*.—Braithwaite Bay, 30 fathoms; Academy Bay, 17-22 fathoms.

Genus **SCHIZOTRICHA****Schizotricha tenella** (Verrill)

*Plumularia tenella* VERRILL, Invert. Vineyard Sound, 1874, p. 731.

*Schizotricha tenella* NUTTING, Am. Hyd., Part I, 1900, p. 80.

*Distribution*.—Jicaron Island, 25-30 fathoms; Isabel Island, 10-25 fathoms.

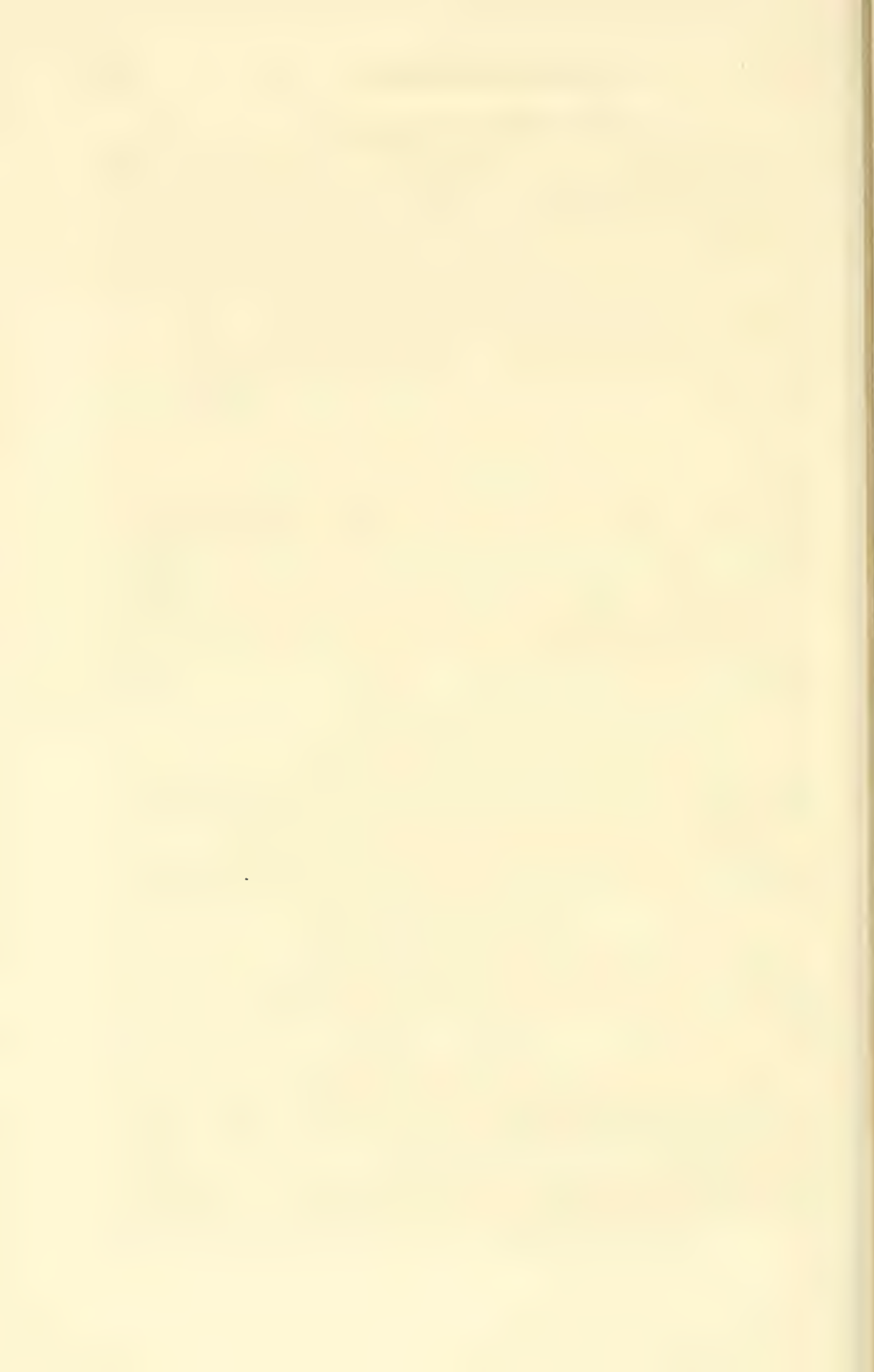
Genus **STREPTOCAULUS****Streptocaulus pulcherrimus** Allman

*Streptocaulus pulcherrimus* ALLMAN, Challenger Hyd., I, 1883, p. 48.

NUTTING, Am. Hyd., Part I, 1900, p. 129.

*Distribution*.—Between Charles and Indefatigable islands, 60 fathoms; off Post Office Bay, 70-80 fathoms; Gardner Bay, 25-35 fathoms.

Some fine specimens of this species, hitherto recorded only from the Cape de Verde Islands, are well provided with gonangia. The largest colony, taken in Gardner Bay, has a length of 56 cm.



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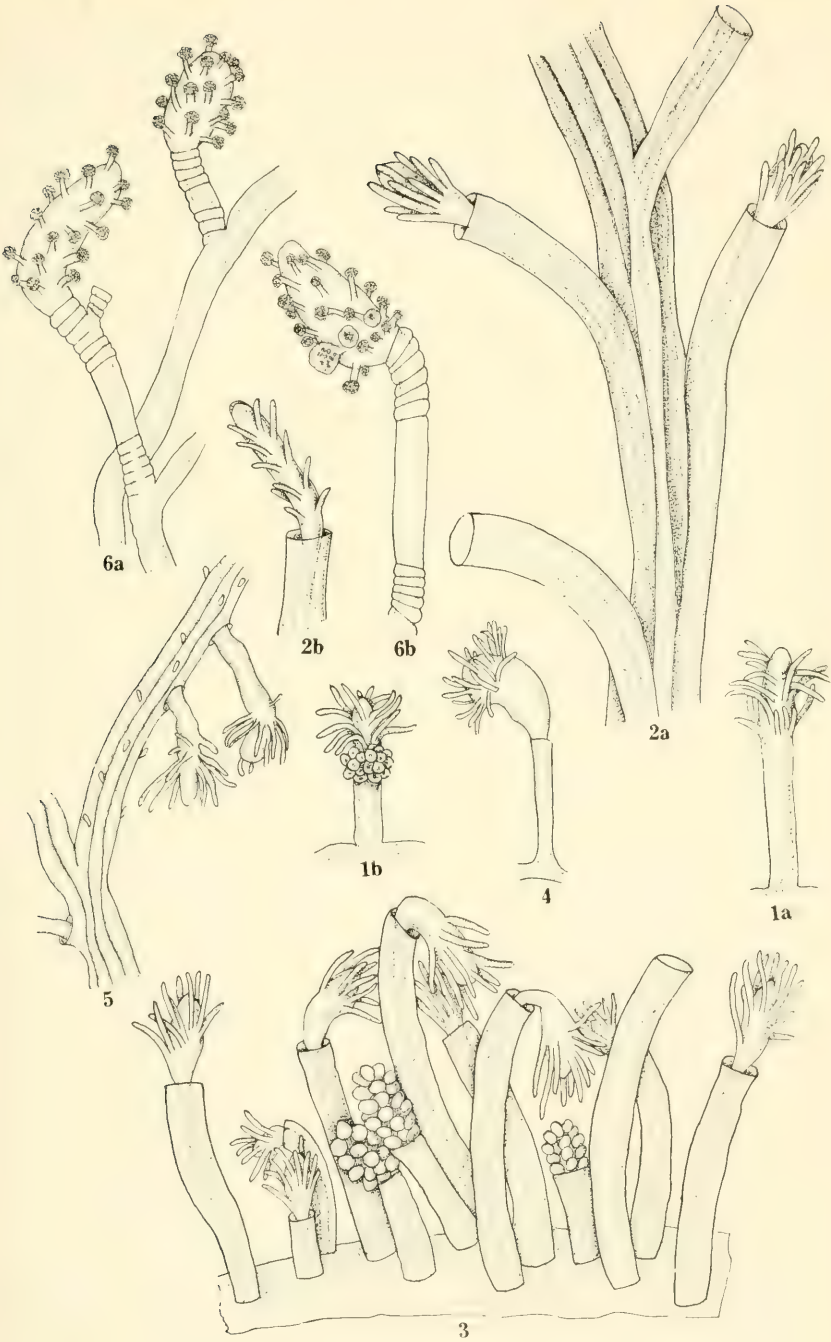
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## PLATE 1

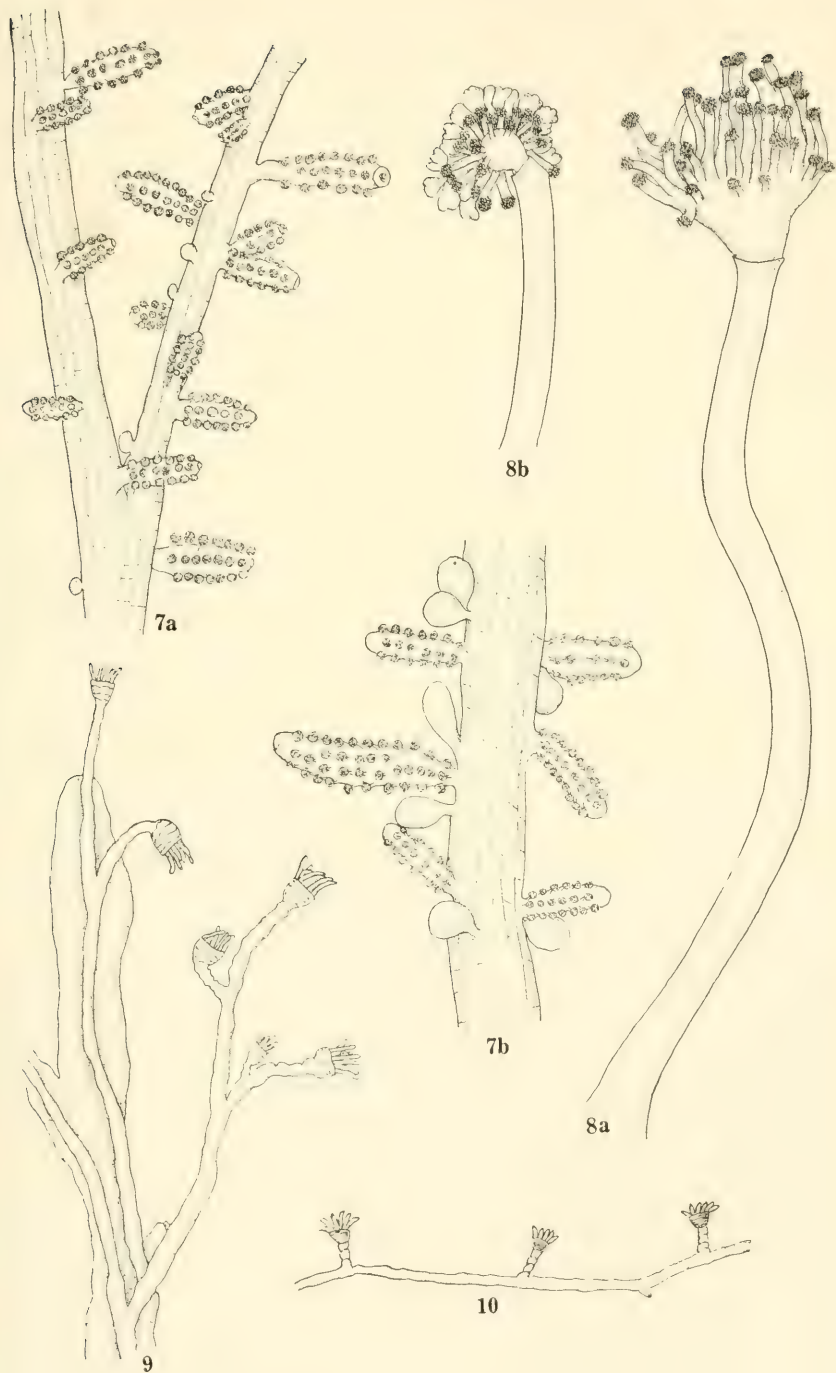
- Fig. 1. *Clava parva*  
a. Nutritive zooid.  
b. Generative zooid.
- Fig. 2. *Corydendrium flabellatum*  
a. Portion of fascicled stem.  
b. Hydranth extended.
- Fig. 3. *Tubiclava laxa*  
Colony showing nutritive and generative zooids.
- Fig. 4. *Tubiclava triserialis*  
A single zooid.
- Fig. 5. *Balea irregularis*  
Portion of fascicled stem and zooids.
- Fig. 6. *Coryne repens*  
a. Two zooids.  
b. Zooid with sporosacs.





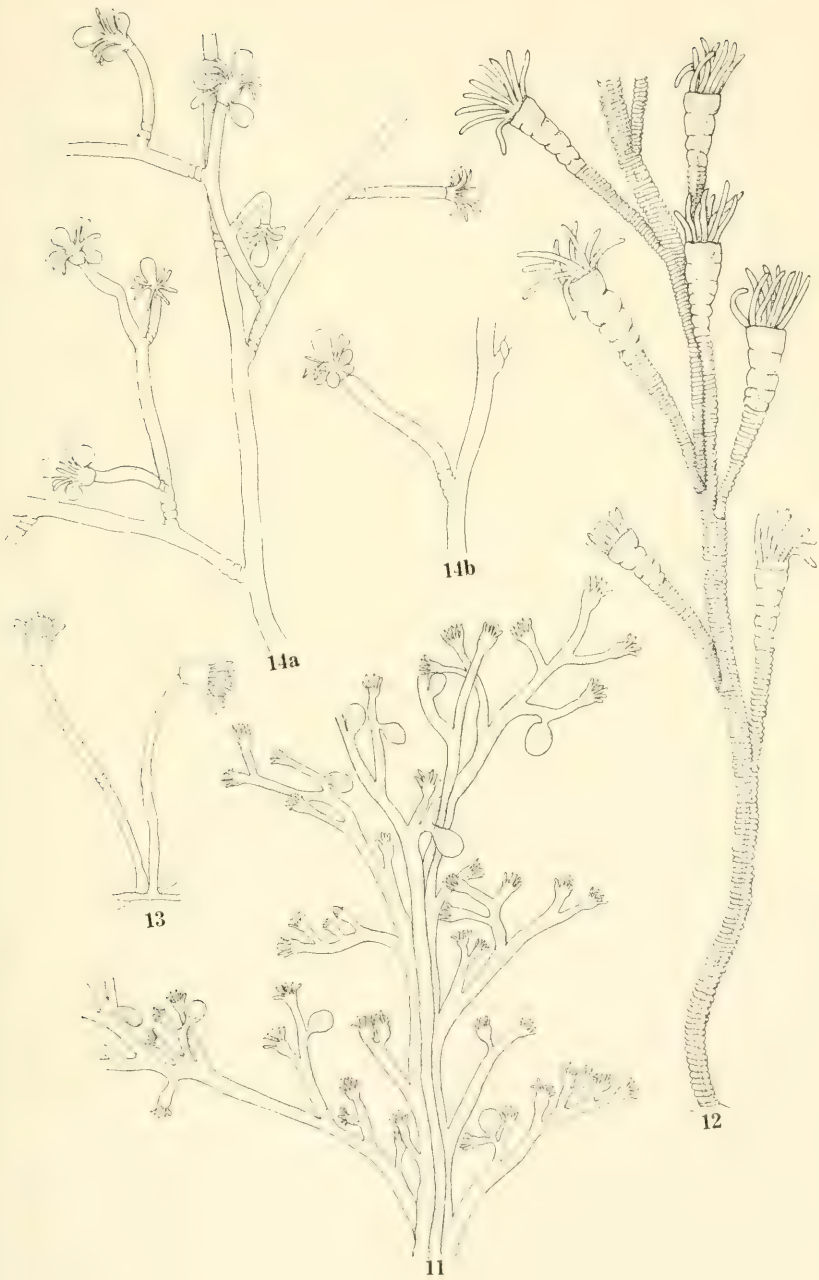
## PLATE 2

- Fig. 7. *Eugemmaria dendritica*  
a. Portion of colony showing branch and zooids.  
b. Portion of colony showing zooids and sporosacs.
- Fig. 8. *Syncoryne flexibilis*  
a. A single zooid.  
b. Zooid with medusa buds.
- Fig. 9. *Bimeria laxa*  
Portion of colony.
- Fig. 10. *Bimeria pygmaea*  
Portion of colony.



## PLATE 3

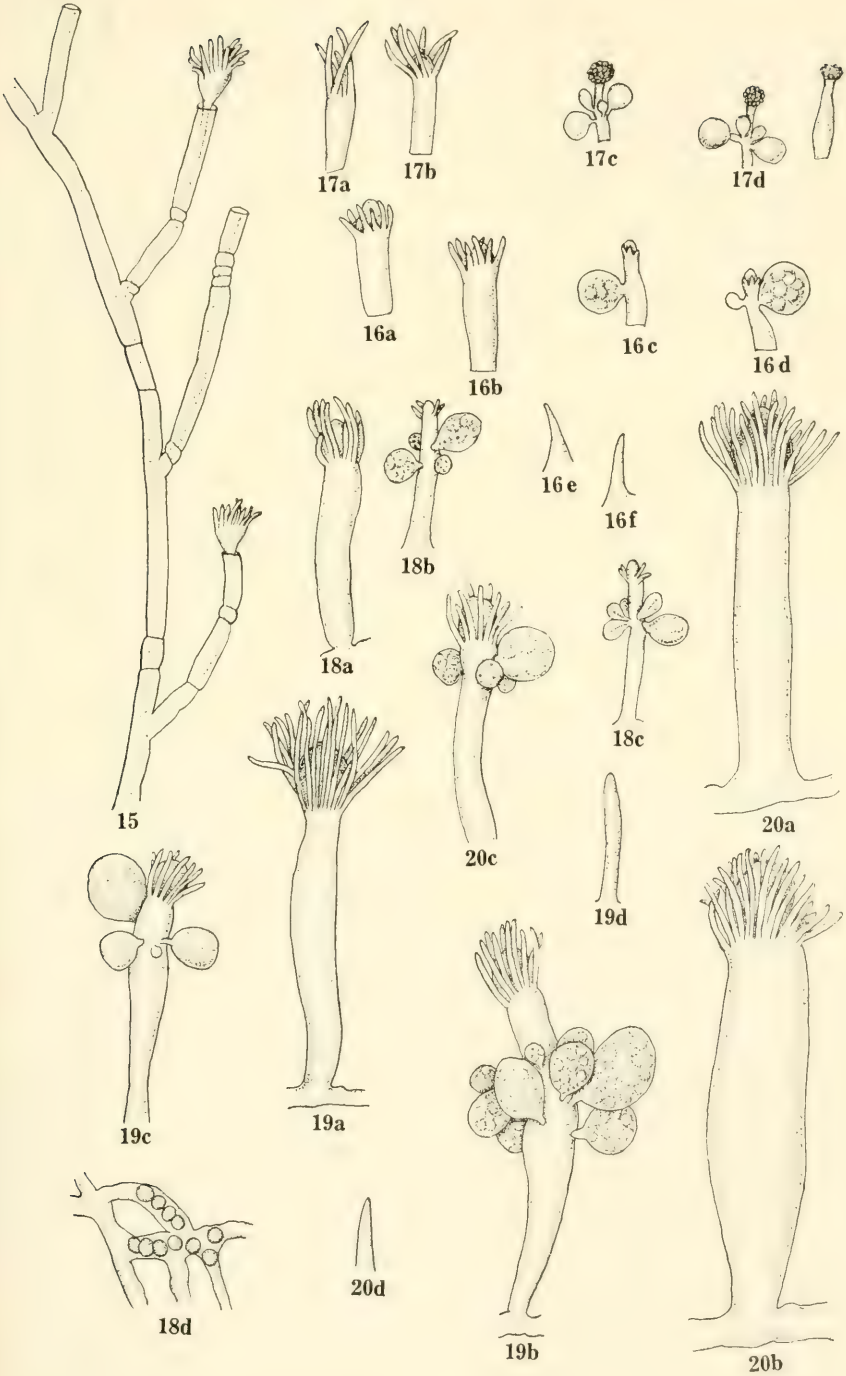
- Fig. 11. *Bougainvillia crassa*  
Portion of colony showing fascicled stem, branches, hydranths,  
and medusa buds.
- Fig. 12. *Perigonimus robustus*  
Portion of colony.
- Fig. 13. *Eudendrium breve*  
Two zooids.
- Fig. 14. *Eudendrium certicaule*  
a. Portion of female colony with sporosacs.  
b. Portion of male colony with sporosacs.





## PLATE 4

- Fig. 15. *Eudendrium nodosum*  
Portion of colony.
- Fig. 16. *Hydractinia disjuncta*  
a and b. Nutritive zooids.  
c and d. Female generative zooids.  
e and f. Spines.
- Fig. 17. *Hydractinia epispongia*  
a and b. Nutritive zooids.  
c and d. Male generative zooids.  
e. Dactylozooid.
- Fig. 18. *Hydractinia hancocki*  
a. Nutritive zooid.  
b. Female generative zooid.  
c. Male generative zooid.  
d. Basal network with spheroidal bodies.
- Fig. 19. *Hydractinia longispina*  
a. Nutritive zooid.  
b. Female generative zooid.  
c. Male generative zooid.  
d. Spine.
- Fig. 20. *Hydractinia multispina*  
a and b. Nutritive zooids.  
c. Female generative zooid.  
d. Spine.



## PLATE 5

Fig. 21. *Hydractinia polycarpa*

- a. Nutritive zooid.
- b. Female generative zooid.
- c. Dactylozooid.
- d. Spine.

Fig. 22. *Hydractinia quadrigemina*

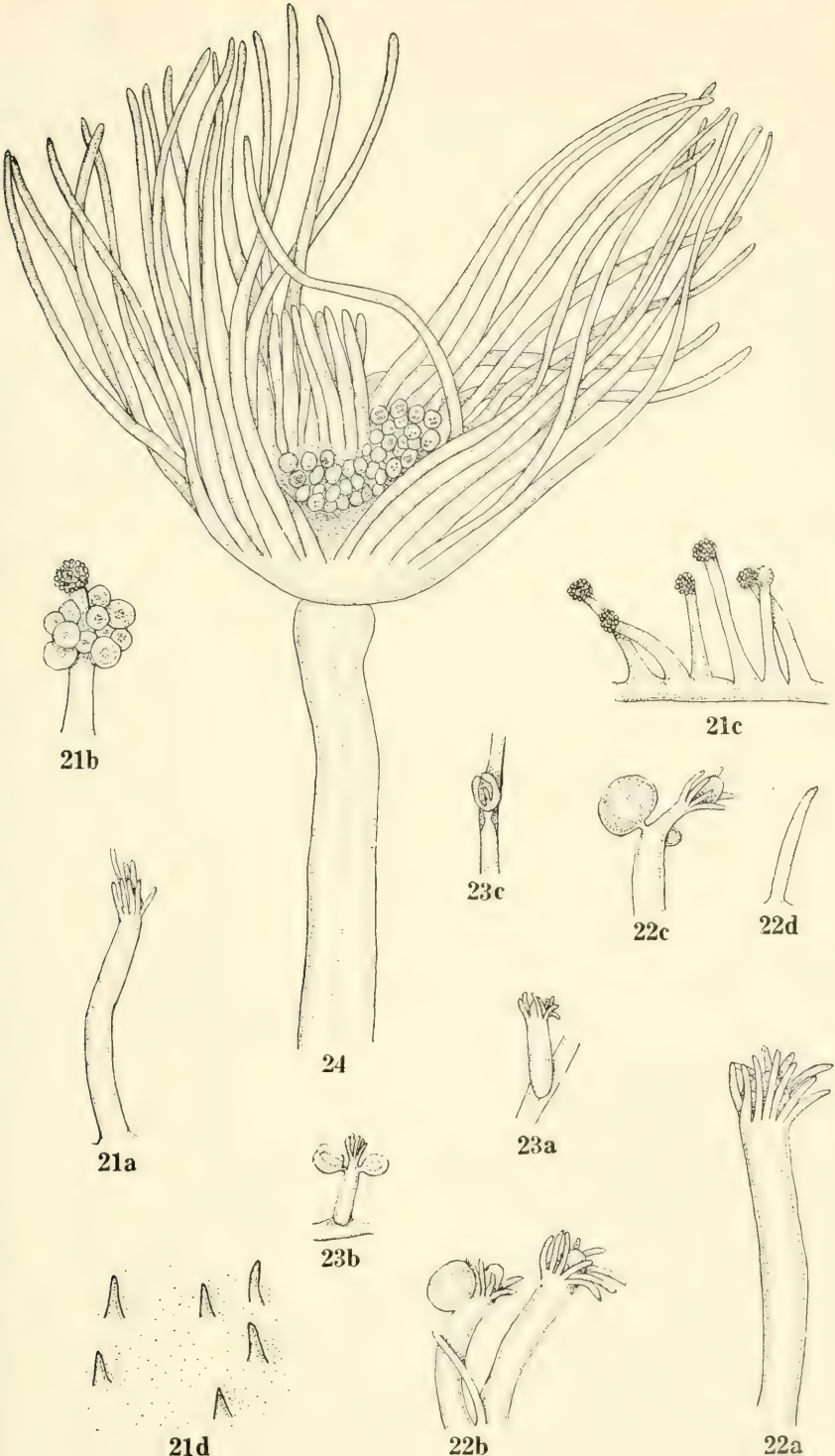
- a. Nutritive zooid.
- b. Nutritive zooid, male generative zooid and spine.
- c. Male generative zooid.
- d. Spine.

Fig. 23. *Podocoryne reticulata*

- a. Nutritive zooid.
- b and c. Generative zooids with medusa-buds.

Fig. 24. *Tubularia integra*

- A zooid showing proximal and distal tentacles and gonophores.

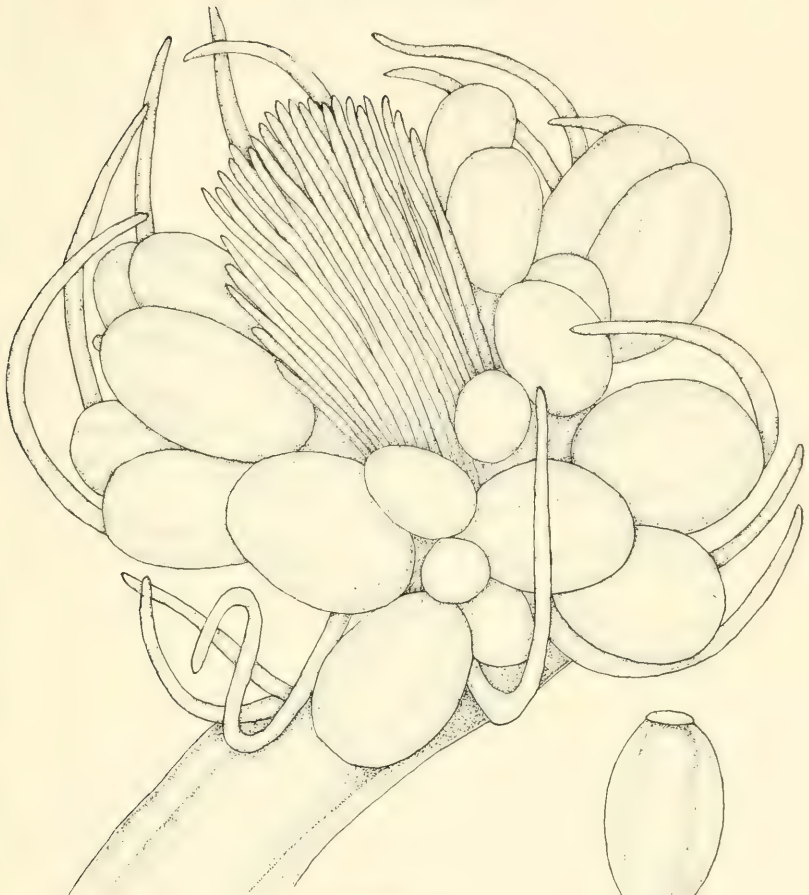


## PLATE 6

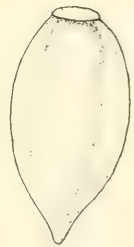
Fig. 25. *Tubularia multidentata*

- a. Immature zooid.
- b. Zooid with tentacles and gonophores.
- c. One gonophore.

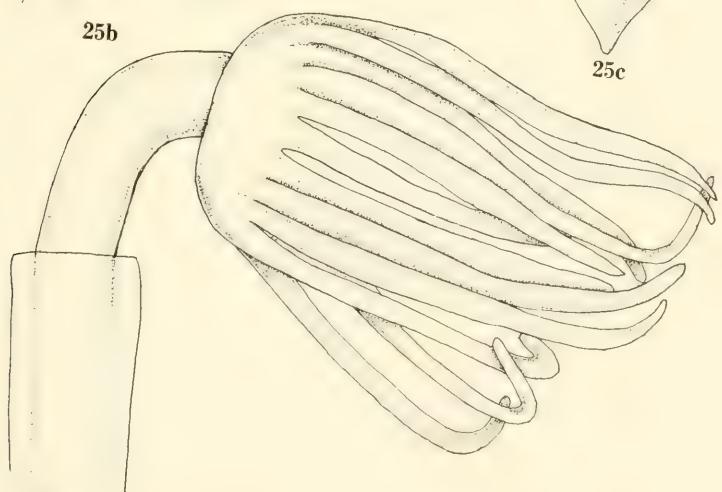




25b



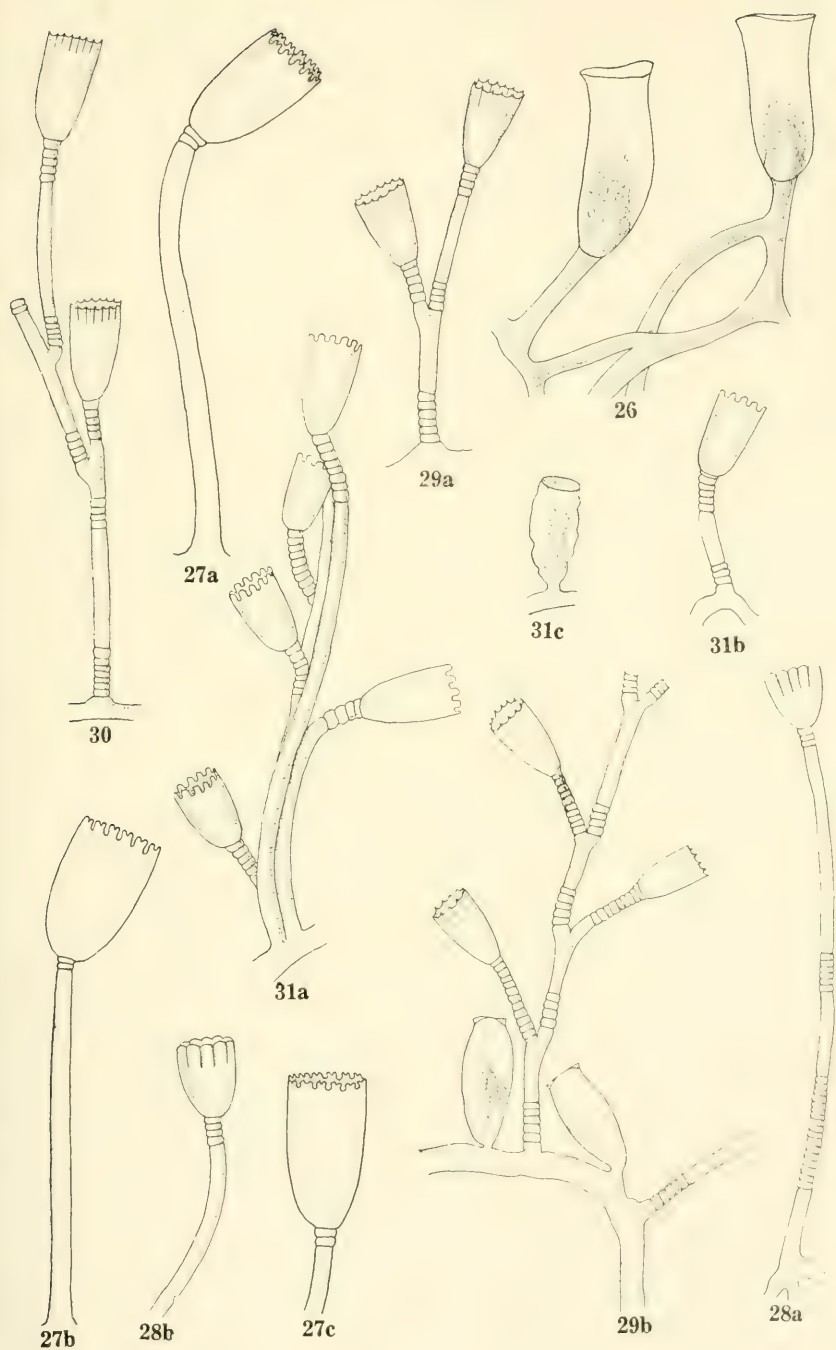
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25a

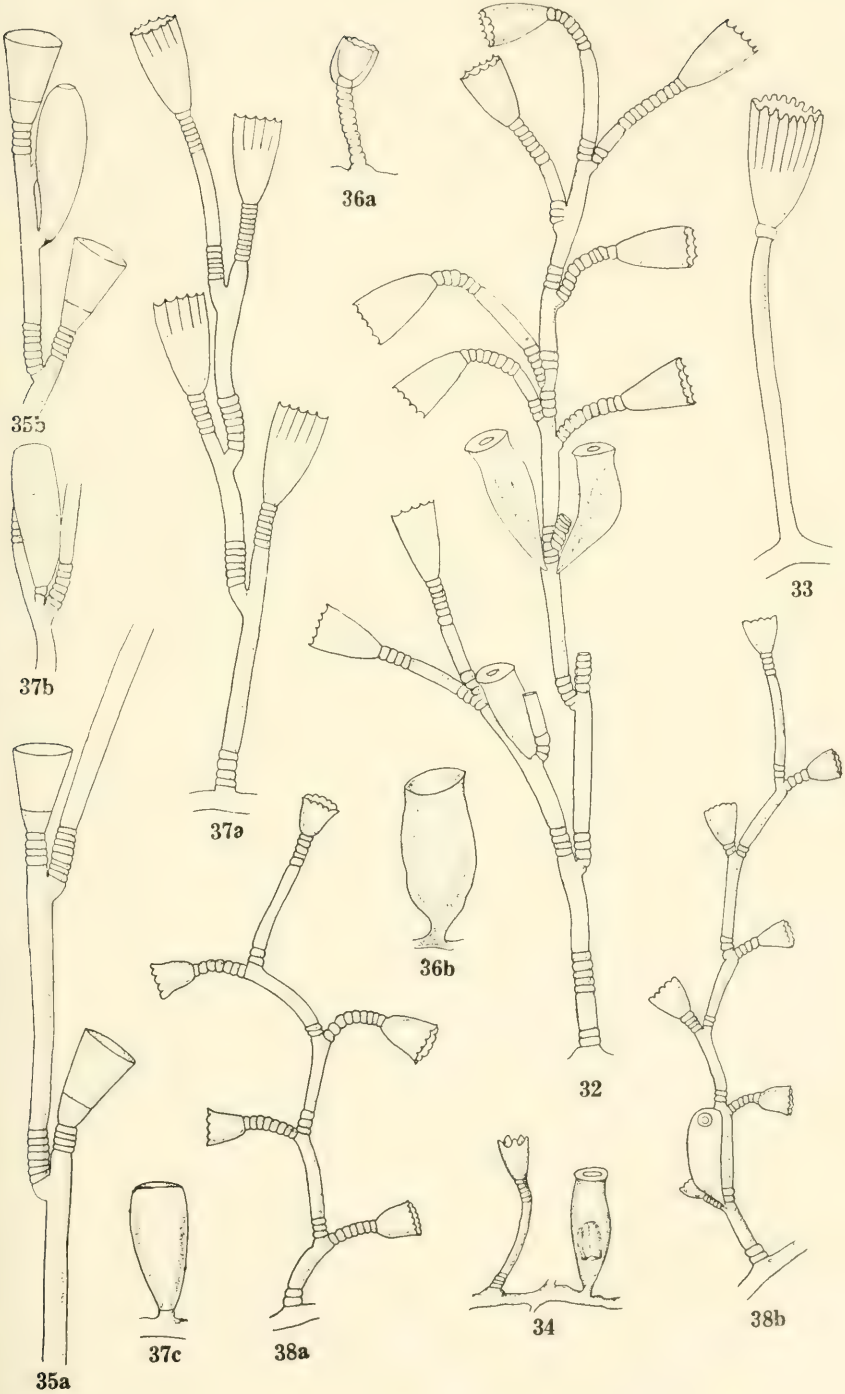
## PLATE 7

- Fig. 26. *Bonneviella minor*  
Two zooids growing from a stolon.
- Fig. 27. *Campanularia emarginata*  
a, b, and c. Hydrothecae.
- Fig. 28. *Campanularia gracilicaulis*  
a and b. Hydrothecae.
- Fig. 29. *Clytia acutidentata*  
a. Colony with two hydrothecae.  
b. Colony with hydrothecae and gonangia.
- Fig. 30. *Clytia carinadentata*  
Colony with hydrothecae.
- Fig. 31. *Clytia fascicularis*  
a. Fascicled stem with hydrothecae.  
b. Single hydrotheca.  
c. Gonangium.



## PLATE 8

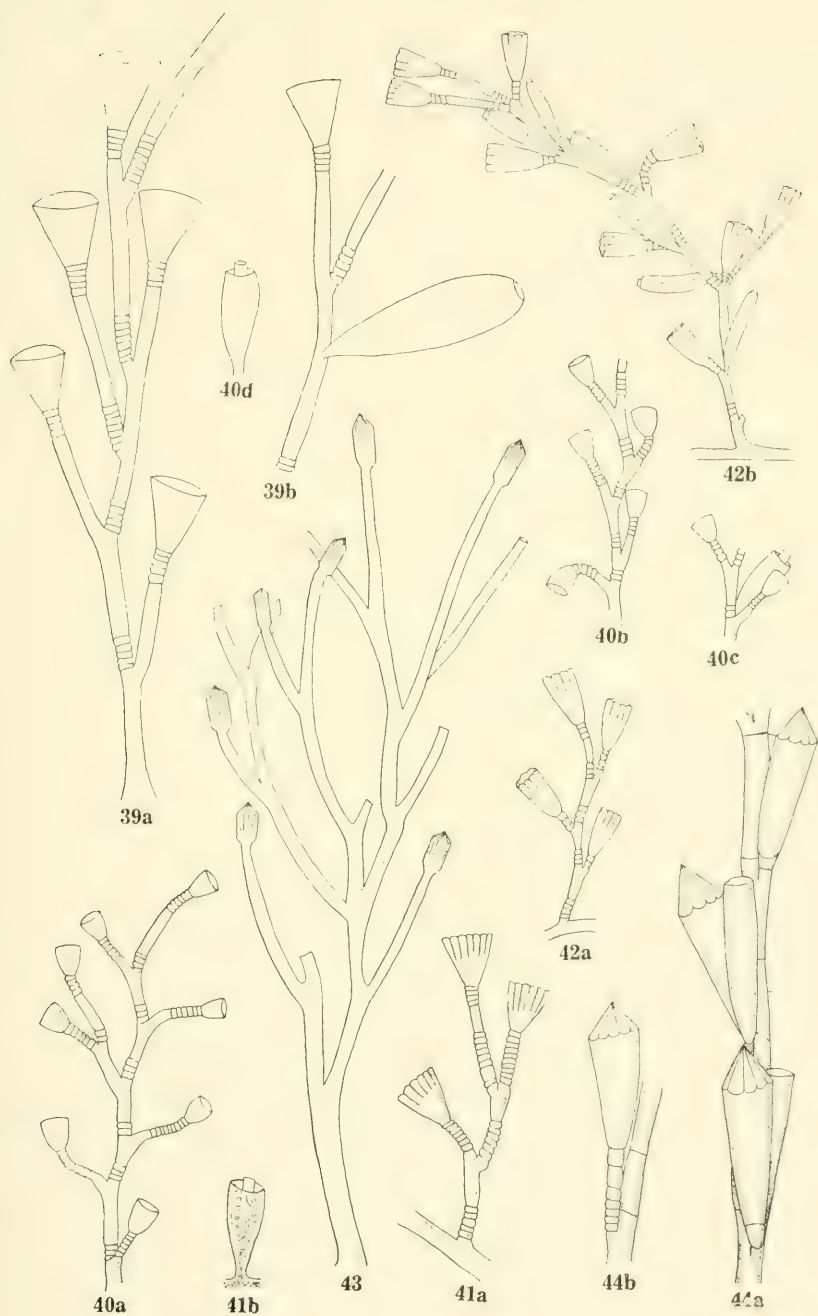
- Fig. 32. *Clytia irregularis*  
Colony with hydrothecae and gonangia.
- Fig. 33. *Clytia multidentata*  
Hydrotheca.
- Fig. 34. *Clytia raridentata*  
Hydrotheca and gonangium.
- Fig. 35. *Clytia seriata*  
a. Portion of colony showing nature of series.  
b. Portion of colony with hydrothecae and gonangium.
- Fig. 36. *Eucopeella minor*  
a. Hydrotheca.  
b. Gonangium.
- Fig. 37. *Gonothyracea serialis*  
a. Colony with hydrothecae.  
b. Gonangium in axil.  
c. Gonangium on stolon.
- Fig. 38. *Obelia alternata*  
a. Colony showing arrangement of hydrothecae.  
b. Colony with hydrothecae and gonangium.





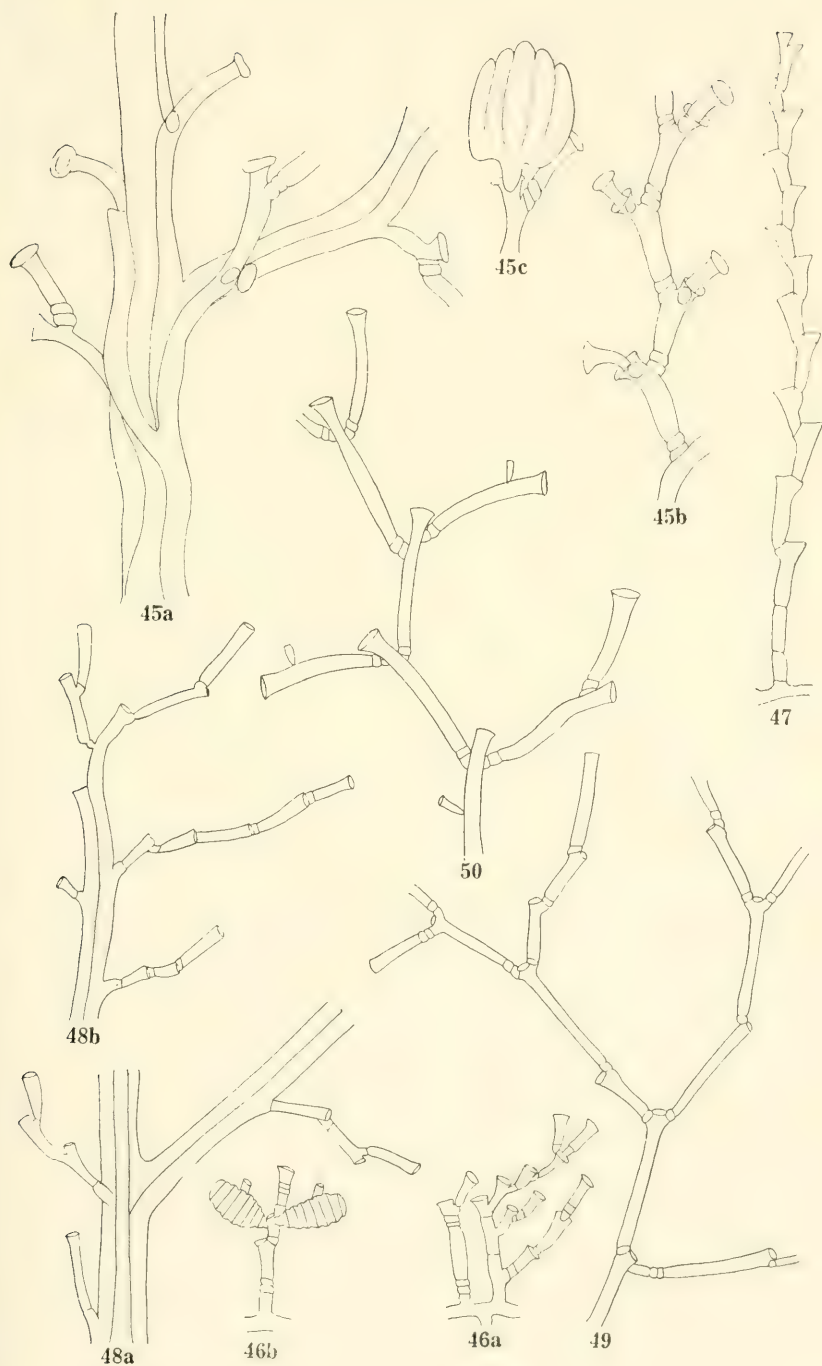
## PLATE 9

- Fig. 39. *Obelia equilateralis*  
a. Colony showing arrangement of hydrothecae.  
b. Portion of colony with gonangium.
- Fig. 40. *Obelia microtheca*  
a and b. Colonies showing hydrothecae.  
c and d. Gonangia.
- Fig. 41. *Obelia obtusidens*  
a. Colony with hydrothecae.  
b. Gonangium.
- Fig. 42. *Obelia tenuis*  
a. Small colony.  
b. Larger colony with hydrothecae and gonangia.
- Fig. 43. *Campanulina ramosa*  
A colony showing arrangement of hydrothecae.
- Fig. 44. *Lovenella nodosa*  
a. Portion of colony with hydrothecae and gonangium.  
b. Hydrotheca with longer pedicel.



## PLATE 10

- Fig. 45. *Halecium fasciculatum*  
a. Portion of colony showing fascicled stem.  
b. Portion of branch, not fascicled.  
c. Gonangium.
- Fig. 46. *Halecium insolens*  
a. Colonies showing arrangement of hydrothecae.  
b. Gonangia.
- Fig. 47. *Halecium regulare*  
Colony showing arrangement of hydrothecae.
- Fig. 48. *Halecium tortum*  
a. Fascicled stem.  
b. Portion of colony showing arrangement of hydrothecae.
- Fig. 49. *Halecium vagans*  
Colony showing branching.
- Fig. 50. *Ophiodissa laxa*  
Portion of colony showing arrangement of hydrothecae and  
- tentacular organs.



## PLATE 11

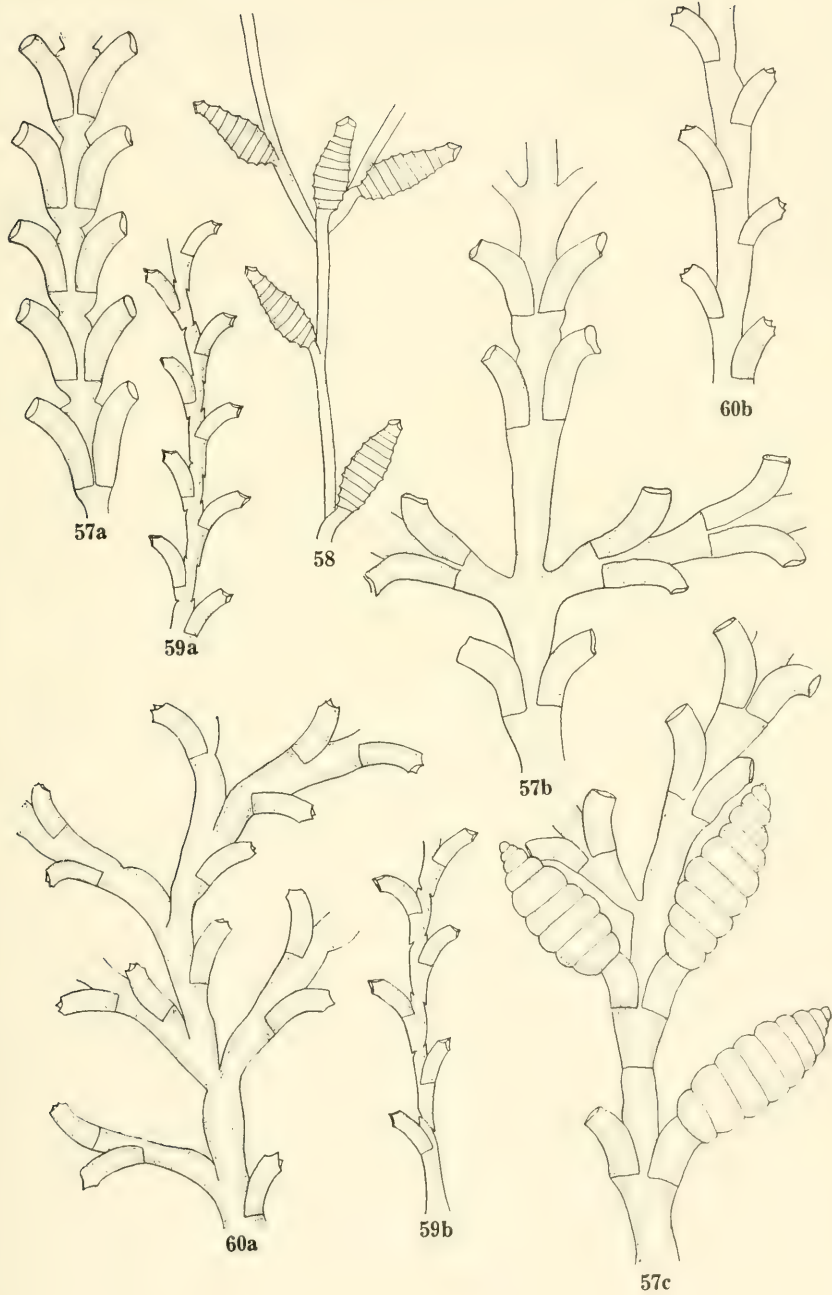
- Fig. 51. *Ophiodissa negligens*  
a and b. Colonies showing arrangement of hydrothecae and tentacular organs.
- Fig. 52. *Scandia corrugata*  
Colony showing hydrothecae and gonangia.
- Fig. 53. *Lafoea intermedia*  
a. Natural size showing coppinia.  
b. Portion of fascicled stem.  
c. Terminal portion of branch.  
d. Coppinia.
- Fig. 54. *Lictorella adhaerens*  
a. Portion of fascicled stem.  
b. Portion of branch.
- Fig. 55. *Synthecium projectum*  
Portion of colony arrangement of hydrothecae.
- Fig. 56. *Synthecium rigidum*  
- Portion of colony showing arrangement of hydrothecae.





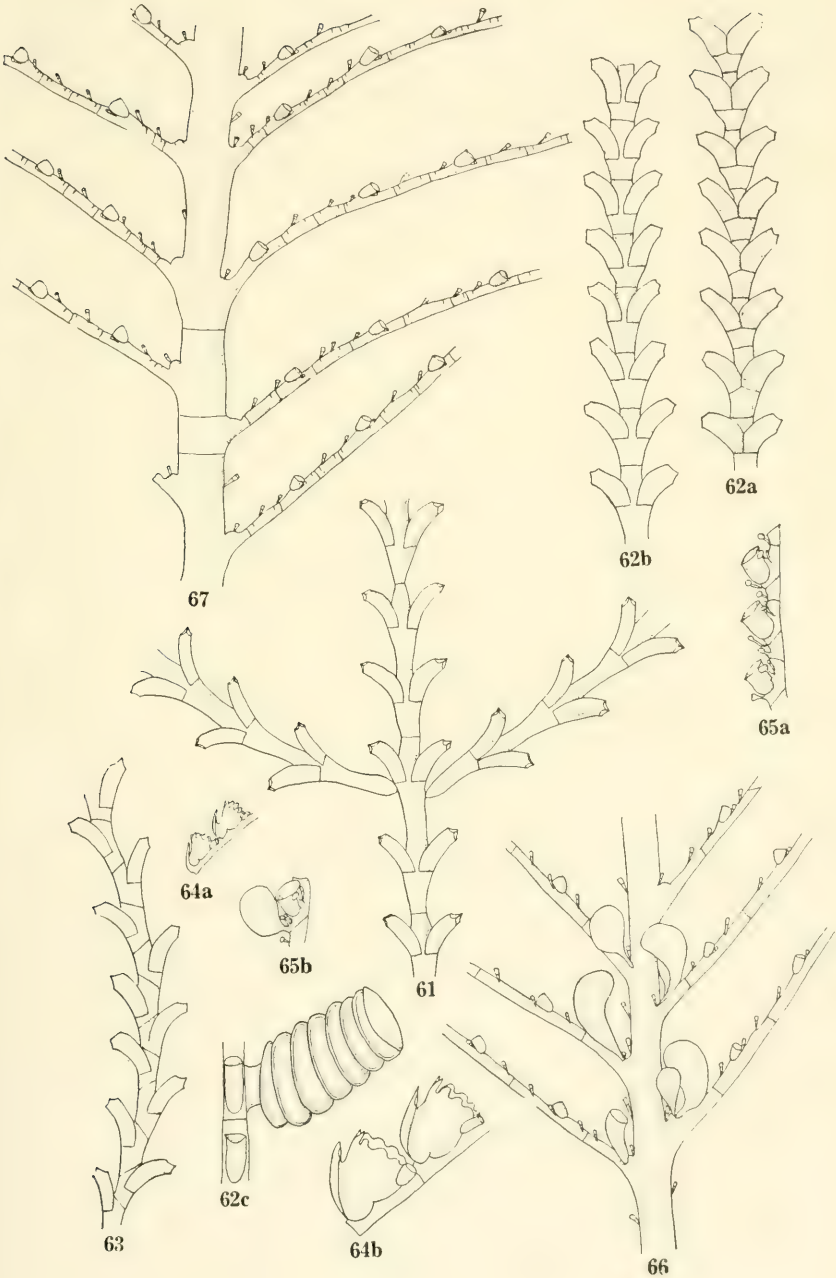
## PLATE 12

- Fig. 57. *Synthecium symmetricum*  
a. Portion of branch showing arrangement of hydrothecae.  
b. Portion of stem showing origin of branches.  
c. Gonangia.
- Fig. 58. *Sertularella ampullacea*  
Portion of colony showing branching and hydrothecae.
- Fig. 59. *Sertularella exilis*  
a and b. Portions of colony showing arrangement of hydrothecae.
- Fig. 60. *Sertularella incisa*  
a. Portion of stem showing branching.  
b. Portion of branch.



## PLATE 13

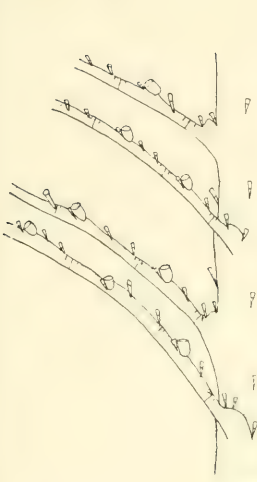
- Fig. 61. *Sertularia anceps*  
Colony showing branching.
- Fig. 62. *Sertularia dispar*  
a. Portion of stem, face view.  
b. Portion of stem, back view.  
c. Gonangium.
- Fig. 63. *Thuiaria simplex*  
Portion of colony showing arrangement of hydrothecae.
- Fig. 64. *Aglaophenia praecisa*  
a. Two hydrothecae on a hydrocladium.  
b. The same further enlarged.
- Fig. 65. *Antennella compacta*  
a. Portion of colony showing hydrothecae.  
b. Gonangium.
- Fig. 66. *Antennularia alternata*  
Portion of colony showing branching, hydrothecae and  
- gonangia.
- Fig. 67. *Antennularia irregularis*  
Portion of colony showing branching and hydrothecae.





## PLATE 14

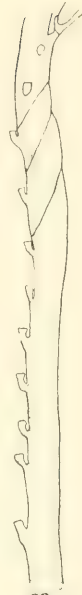
- Fig. 68. *Antennularia tetraseriata*  
Portion of colony showing hydrocladia arrangement.
- Fig. 69. *Cladocarpus tortus*  
a. Basal portion of stem.  
b. Portion of stem and proximal hydrothecae on the hydrocladia.  
c. Lateral view of hydrocladium.
- Fig. 70. *Plumularia acutifrons*  
Portion of colony showing hydrocladia.
- Fig. 71. *Plumularia alternata*  
a. Portion of colony showing hydrocladia.  
b. Gonangia.
- Fig. 72. *Plumularia biarmata*  
Portion of colony showing hydrocladia.



68



69b



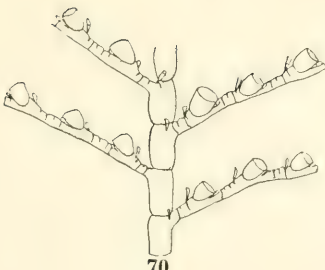
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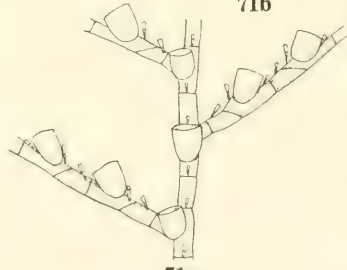
72



71b



70



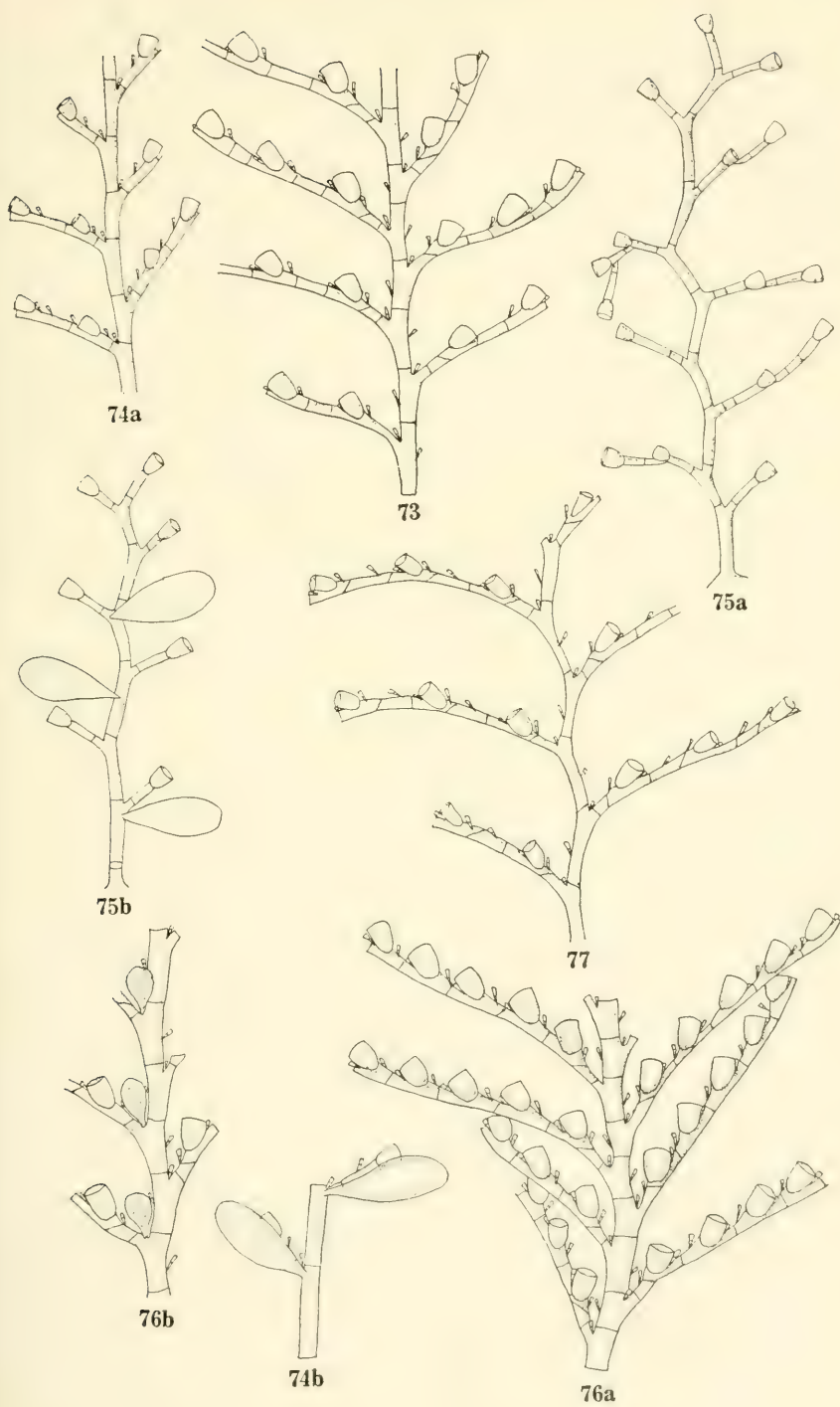
71a



69c

## PLATE 15

- Fig. 73. *Plumularia defecta*  
Portion of colony showing hydrocladia.
- Fig. 74. *Plumularia inermis*  
a. Portion of colony showing hydrocladia.  
b. Gonangia.
- Fig. 75. *Plumularia magellanica*  
a. Colony showing hydrocladia.  
b. Gonangia.
- Fig. 76. *Plumularia propinqua*  
a. Colony showing hydrocladia.  
b. Gonangia.
- Fig. 77. *Plumularia sinuosa*  
Portion of colony showing hydrocladia.







REPORTS ON THE COLLECTIONS OBTAINED BY ALLAN HANCOCK PACIFIC EXPEDITIONS OF  
VELERO III OFF THE COAST OF MEXICO, CENTRAL AMERICA, SOUTH AMERICA, AND GALA-  
PAGOS ISLANDS IN 1932, IN 1933, IN 1934, IN 1935, IN 1936, IN 1937, AND IN 1938.

## HYDROIDS OF THE 1936 AND 1937 ALLAN HANCOCK PACIFIC EXPEDITIONS

*By* C. McLEAN FRASER

THE UNIVERSITY OF SOUTHERN CALIFORNIA PUBLICATIONS

ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 4, NUMBER 2

ISSUED OCTOBER 20, 1938

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THE UNIVERSITY OF SOUTHERN CALIFORNIA PRESS

LOS ANGELES, CALIFORNIA

# HYDROIDS OF THE 1936 AND 1937 ALLAN HANCOCK PACIFIC EXPEDITIONS

C. McLEAN FRASER

In each of the seven Hancock Expeditions to date, 1932-1938, hydroids have been collected. In 1934 special attention was paid to hydroid collecting and the collection obtained has been reported upon by itself. In 1936 and 1937 collections were made in a somewhat restricted and well-defined area, no part of which was visited in the 1934 Expedition. It includes the west coast of Lower California, north of Cerros Island, and the Gulf of California.

It might have been well to include the remainder of the west coast of Lower California in this general area, but much material was obtained from this region in 1934, and this has already received attention. No collections were made there in 1936 and 1937.

The hydroids collected in the other four years, 1932, 1933, 1935, and 1938, will be treated together later.

Again I wish to acknowledge my obligation to Captain Hancock, his officers and ship's company of the *VELERO III* and all those associated with these Expeditions for the collection and the preservation of the hydroids. Dr. Irene McCulloch of the Department of Zoology of The University of Southern California sorted the material and looked after it until it was forwarded for examination. Her many kindnesses and her continued interest in the progress of the work are much appreciated. To Dr. Josephine F. L. Hart I am indebted for the drawings used in illustration.

## DISTRIBUTION

Of the 56 species in the collection, nine are described as new (the gonosome of *Antennularia tetraseriata* Fraser is described for the first time). Of the 47 species previously reported, 36 appeared in the 1934 collection. Of the eleven species that did not so appear, ten have been reported from farther north along the Pacific coast, and one, *Plumularia attenuata* Allman, from the West Indian region.

Ten species were obtained from the west coast of Lower California, one of them, *Abietinaria expansa*, being new. Of these only one species, *Aglaophenia octocarpa* Nutting, was obtained in the Gulf of California,

and that just at the entrance, off Point Piastla. This might be taken to indicate that there is nothing in common in the waters to the westward of Lower California and those in the Gulf of California, were it not for the fact that of the 38 previously described species obtained in the Gulf of California in this collection twelve were obtained from the west coast in the 1934 collection. The 1934 collection was all from Cerros Island south; the 1936 and 1937 collections, north of Cerros Island.

The hydroid fauna of the Gulf seems to be rather a mixture. While that of the west coast of Lower California is definitely northeast Pacific in type, that of the Gulf, if this collection is representative, is a mixture of species from the north and from the south, the latter related to those from the West Indian region.

Of the 38 species above referred to, 22 have been reported from the Pacific, north of the Mexican boundary, and 25 from the Atlantic, but as 15 species have been reported in both of these areas, there are left but seven North Pacific and ten Atlantic species that help to show any trend. More extensive and intensive collecting must be done before any definite conclusions can be drawn.

The most striking feature of the hydroid fauna of the Gulf is the preponderance of the Plumularidae, especially of *Aglaophenia* and *Antennularia*. It is in these two genera that the most of the new species were found. It may be that here there is a very suitable environment for this family, or, on the other hand, it may be that as these, in general, appear in robust colonies, they are more readily observed in general collecting, in which case a more detailed examination of the fresh material might produce a similar abundance in other families. That the latter explanation is the probable one is indicated by the fact that there were only four gymnoblastic species (there were 46 in the 1934 collection) and very few of the smaller campanularians.

#### SYNONYMY

Apart from those that are new, all of the species with the exception of *Plumularia attenuata* Allman (Allman, G. J. Mem. Mus. Comp. Zool. Harvard, 1877, p. 30) are mentioned and synonymy given either in Hydroids of the 1934 Allan Hancock Pacific Expedition or in Hydroids of the Pacific Coast of Canada and the United States (Fraser, The University of Toronto Press, Toronto, 1937). It seems unnecessary to repeat the synonymy here.

## SPECIES AND DISTRIBUTION

Family **Atractylidae**

*Bimeria gracilis* Clark.—Entrance to Angeles Bay, 25 fathoms.

*Bimeria tenella* Fraser.—San Quentin Bay, 25 fathoms.

Family **Eudendridae**

*Eudendrium ramosum* (Linnaeus).—Off White Rock, Isla Partida, 45 fathoms; Ildefonso Island, 50 fathoms.

*Eudendrium tenellum* Allnien.—San Pedro Nolasco Island, 75 fathoms.

*Eudendrium tenue* A. Agassiz.—Off White Rock, Isla Partida, 45 fathoms.

Family **Campanularidae**

?*Campanularia emarginata* Fraser.—San Jaime Banks, off Cape San Lucas, 75 fathoms; San Pedro Nolasco Island, 45 fathoms.

*Campanularia hincksi* Alder.—Off White Rock, Isla Partida, 45 fathoms.

*Campanularia urceolata* Clark.—Rosario Bay, 10-15 fathoms.

*Clytia acutidentata* Fraser.—Off White Rock, Isla Partida, 45 fathoms.

*Clytia edwardsi* (Nutting).—Off White Rock, Isla Partida, 45 fathoms.

*Clytia irregularis* Fraser.—San Quentin Bay, 25 fathoms.

*Clytia kincaidi* (Nutting).—Consag Rock, 10-25 fathoms.

*Clytia universitatis* Torrey.—Off White Rock, Isla Partida, 45 fathoms.

*Gonothyraea gracilis* (Sars).—South and east of San Marcos Island, 20 fathoms.

*Obelia plicata* Hincks.—San Lorenzo Channel, Espiritu Santo Island, 24 fathoms; Puerto Refugio, Angel de la Guardia Island, 50-75 fathoms.

Family **Campanulinidae**

*Campanulina forskalea* (Peron et LeSueur).—San Pedro Nolasco Island, 75 fathoms; Puerto Refugio, Angel de la Guardia Island, 50-75 fathoms.

*Lovenella producta* (Sars).—San Pedro Nolasco Island, 75 fathoms; Puerto Refugio, Angel de la Guardia Island, 50-75 fathoms.



Family **Halecidae**

*Halecium beani* (Johnston).—East of Cape San Lucas, 10-15 fathoms; Consag Rock, 10-25 fathoms.

*Halecium gracile* Verrill.—Off White Rock, Isla Partida, 45 fathoms.

*Halecium nanum* Alder.—Off White Rock, Isla Partida, 45 fathoms.

*Halecium parvulum* Bale.—Rosario Bay, 10-15 fathoms.

*Halecium tenellum* Hincks.—Off White Rock, Isla Partida, 45 fathoms.

Family **Hebellidae**

*Hebella calcarata* (Agassiz).—Off White Rock, Isla Partida, 45 fathoms.

*Scandia corrugata* Fraser.—San Pedro Nolasco Island, 75 fathoms.

*Scandia mutabilis* (Ritchie).—East of San Marcos Island, 18 fathoms; San Francisco Island, 47 fathoms.

Family **Lafoeidae**

*Filellum serpens* (Hassall).—San Jaime Banks, off Cape San Lucas, 75 fathoms; San Pedro Nolasco Island, 75 fathoms; south of Isla Partida, 40 fathoms.

*Lafoea dumosa* (Fleming).—Off White Rock, Isla Partida, 50 and 45 fathoms.

Family **Sertularidae**

*Abietinaria anguina* (Trask).—San Quentin Bay, 25 fathoms.

*Abietinaria expansa* Fraser.—Rosario Bay, 10-15 fathoms.

*Pasya quadridentata* (Ellis and Solander).—Consag Rock, 10-25 fathoms.

*Sertularella ampullacea* Fraser.—San Lorenzo Channel, Espiritu Santo Island, 24 fathoms.

*Sertularella pedrensis* Torrey.—Off White Rock, Isla Partida, 40 and 45 fathoms; Ildefonso Island, 50 fathoms; Puerto Refugio, Angel de la Guardia Island, 50-75 fathoms; off Cape San Lucas, 75 fathoms.

*Sertularia cornicina* (McCrady).—Consag Rock, 10-25 fathoms; off White Rock, Isla Partida, 45 fathoms.

*Sertularia desmoides* Torrey.—South of Isla Partida, 40 fathoms.

*Sertularia furcata* Trask.—Santa Rosalia Bay, 15 fathoms; Rosario Bay, 10-15 fathoms; San Quentin Bay, 25 fathoms.

Family **Plumularidae**

- Aglaophenia diegensis* Torrey.—Consag Rock, 10-25 fathoms; north of Lobos Point, shore; Perdita Island,  $\frac{1}{4}$  mile north of San Francisco Island, 30 fathoms; San Francisco Island, shore; Espiritu Santo Island, shore.
- Aglaophenia latirostris* Nutting.—Rosario Bay, 10-15 fathoms; San Quentin Bay, 25 fathoms.
- Aglaophenia longicarpa* Fraser.—San Lorenzo Channel, Espiritu Santo Island, 24 fathoms.
- Aglaophenia lophocarpa* Allman.—North of San Pedro Nolasco Island, 100 fathoms.
- Aglaophenia octocarpa* Nutting.—Near Point Piastla, 6-8 fathoms; Santa Rosalia Bay, 15 fathoms.
- Aglaophenia pinguis* Fraser.—San Francisco Island, shore.
- Aglaophenia propinqua* Fraser.—Port Escondido, 20 fathoms.
- Aglaophenia struthionides* (Murray).—San Quentin Bay, 3-5 fathoms.
- Aglaophenia symmetrica* Fraser.—San Pedro Nolasco Island, 75 fathoms.
- Antennularia compacta* Fraser.—Off Francisquito Bay, 10-20 fathoms.
- Antennularia irregularis* Fraser.—Off Francisquito Bay, 10-20 fathoms.
- Antennularia reversa* Fraser.—Puerto Refugio, Angel de la Guardia Island, 50-75 fathoms.
- Antennularia septata* Fraser.—North of San Esteban Island, 20-70 fathoms; Puerto Refugio, Angel de la Guardia Island, 50-75 fathoms.
- Antennularia tetraseriata* Fraser.—San Jaime Bank, off Cape San Lucas, 75 fathoms; San Esteban Island, 35 fathoms.
- Lytocarpus philippinus* (Kirchenpauer).—Ildefonso Island, 50 fathoms.
- Monostaechas quadridens* (McCrary).—Off White Rock, Isla Partida, 45 fathoms; Ildefonso Island, 50 fathoms.
- Plumularia attenuata* Allman.—San Lorenzo Channel, Espiritu Santo Island, 5-15 fathoms; east of San Marcos Island, 18 fathoms.
- Plumularia corrugata* Nutting.—Inside anchorage, San Francisco Island, 15 fathoms; San Francisco Island, 47 fathoms; entrance to Angeles Bay, 20-70 fathoms.
- Plumularia lagenifera* Allman.—Off White Rock, Isla Partida, 45 fathoms; entrance to Angeles Bay, 25 fathoms.
- Plumularia setacea* (Ellis).—San Lorenzo Channel, Espiritu Santo Island, 24 fathoms.
- Plumularia tenuissima* Fraser.—San Jaime Banks, off Cape San Lucas, 6-8, 75 and 120 fathoms; Salinas Bay, Carmen Island, 20 fathoms.

## DESCRIPTION OF NEW SPECIES

***Abietinaria expansa*, new species**

Plate 16, Fig. 1

*Trophosome*.—Colony (largest fragment 5 cm. high) rather rigid, with a rigid main stem, which is almost straight, the sinuities being very slight, a few large branches making a wide angle with the stem, somewhat irregularly placed, each looking like a portion of the main stem. The smaller, unbranched branches are quite regularly placed, alternately, on the two sides, usually with the hydrothecae on the stem between two successive branches on the same side. These small branches are rigid also, and the branches, large and small, are in the same plane. The whole colony is much spread out. The nodes on the stem and on the branches are well marked but are not regularly placed. The hydrothecae on the branches are subopposite, rather than alternate, swollen at the base and narrowing to a neck, i.e., of the *abietina* type, about one-half free; margin entire.

*Gonosome*.—Gonangia appear along the face of the branches, not regularly spaced. In face view, they are pear-shaped, with a short, curved pedicel, a distal neck, with an oval aperture. The other diameter is much less and hence the gonangium is elliptical in side view. Length 1.0 mm., greater diameter 0.5 mm., lesser diameter 0.3 mm.

The trophosome of this species is very similar to that of *A. amphora* Nutting. The main difference is in the few large branches that are again branched; the pairs of hydrothecae on the branches are rather more distant.

The gonosome in the two species bears little resemblance. The large gonangia with prominent ridges, clustered on the main stem, of *A. amphora* are little like the much smaller solitary gonangia on the branches of *A. expansa*.

***Aglaophenia longicarpa*, new species**

Plate 16, Fig. 2

*Trophosome*.—Colonies up to 10 cm. in height, with dark brown, almost black, somewhat flexible, main stem, and light brown hydrocladia; these well graded in length, but, at the greatest, not more than 15 mm. long. Main stem divided into regular internodes, each with a hydrocladium arising from a process near the distal end; the hydrocladia coming off in regular alternation from the stem, two of them in

succession making an angle of about  $60^{\circ}$ . The nodes in the hydrocladia are quite distinct, and, as the hydrothecae are quite close to each other and are short and stout, the internodes are short also. The margin of the hydrotheca bears nine teeth, the median one, small but sharp, straight or slightly retrorse; all the others are larger, more rounded at the tip, but not very deep. The intrathecal ridges are distinct. The mesial nematophore does not project very far from the face of the hydrotheca and does not reach the margin of the hydrotheca; the supracalcine nematophores are large, reaching above the margin of the hydrotheca; the three nematophores on each cauline internode are similarly tubular.

*Gonosome*.—The corbulae are rather numerous and are conspicuous on account of their great length, with 17 or 18 pairs of leaves in the fully developed corbula. The margins of the leaves are lobed, the lobes being somewhat incised, and, in consequence, when the lobes of the two adjacent leaves meet, there are distinct lenticular spaces, or openings into the interior of the corbula. There is one hydrotheca on the hydrocladium between the corbula and the stem.

### ***Aglaophenia pinguis*, new species**

Plate 16, Fig. 3

*Trophosome*.—Colonies up to 18 cm., simple, unbranched, with dark brown stem, and much lighter brown hydrocladia. The stem is divided into regular internodes by transverse nodes, with a hydrocladial process on each, some distance from the end, the hydrocladia alternating from side to side. Hydrocladia nodes distinct; internodes short, with little space between the successive hydrothecae; hydrothecae broad in both diameters as compared with the length, adherent throughout practically the whole length; two intrathecal ridges well marked; margin with eight similar, straight, rather blunt, teeth. Supracalcine nematophores curved, reaching to, or slightly above the margin of the hydrotheca; mesial nematophore short, but projecting well out from the hydrotheca; two cauline nematophores on each internode of the stem, one well below, and the other close above, the hydrocladial process; two on the hydrocladial process, one on the face and the other on the back.

*Gonosome*.—Corbulae numerous, scattered throughout the length of the colony, deep for the length, with nine or ten pairs of leaves; one hydrotheca between the corbula and the hydrocladial process.



**Aglaophenia propinqua, new species**

Plate 16, Fig. 4

*Trophosome*.—Colonies, up to 12 cm., unbranched or very slightly branched, with a heavy, dark brown main stem and light brown, almost white, hydrocladia. The stem is distinctly divided into internodes, each with a hydrocladial process some distance from the distal end; the bases of these processes are so much on the face of the internode, they are not far from being in line, but the hydrocladia turn almost immediately to the right or to the left to make the regular alternate arrangement, the outer portions being nearly in the same plane. The hydrocladium is divided into internodes by faint nodes; the hydrotheca occupies the whole length of the internode, so that the margin of the one hydrotheca is practically touching the base of the next hydrotheca in succession. The hydrotheca is rather stout for the length. There are nine teeth on the margin, but they are so low that the margin might be described as wavy; the small, median tooth comes to a sharp point, but the others, nearly equal, are more rounded. The septal ridges are faint; the supracalcine nematophores are large, over-topping the margin; the mesial nematophore extends upward for about two thirds of the length of the hydrotheca and then projects but a short distance; of the three cauline nematophores on each internode, the one above and the one below the hydrocladial process are considerably larger than the one on the process.

*Gonosome*.—Not observed.

**Aglaophenia symmetrica, new species**

Plate 17, Fig. 5

*Trophosome*.—Colonies—18 cm.—growing in clusters; the hydrocladia are long, up to 2 cm., and graded in length very uniformly so as to give a graceful symmetry to the colony. As the main stems are light brown and the hydrocladia almost white, the species is a most handsome one. The stem is relatively slender, with the nodes indistinct or absent; the hydrocladia are given off at a wide angle and they might almost be described as being in opposite pairs, rather than regularly alternate. On the hydrocladia, the nodes are distinct and the hydrotheca occupies practically the whole length of the internode. The hydrotheca is large, 0.5 mm. long, but well proportioned; the intrathecal ridges are definite but not extensive. There are nine regularly rounded teeth on the margin, the median one rather slender, erect, the second from the



median on each side is the largest, the first and third, similar in size, the fourth smaller. The supracalcine nematophores reach to, or slightly beyond, the margin of the hydrotheca; they are narrower proximally than distally; the mesial nematophore reaches about half way up the face of the hydrotheca, with but a small portion free; the usual three cauline nematophores are associated with the origin of the hydrocladium, they are all tubular.

*Gonosome*.—The corbulae appear at irregular intervals on both sides of the stem. The total length of the corbula, which is slightly curved, is about 4 mm. The particular one described had eleven pairs of leaves; the nematophores on the margin of the leaves are somewhat distant and they are relatively small; at the base of each leaf margin there is a prominent nematophore with a conical tip pointing to the base of the corbula. There is one hydrotheca on the hydrocladium between the corbula and the hydrocladial process.

### ***Antennularia compacta*, new species**

Plate 17, Fig. 6

*Trophosome*.—Colony rather short—maximum 4 cm.—with a short stem that shows the fasciculation and canaliculation very readily when living or freshly preserved. The hydrocladia are arranged in rather definite whorls toward the base but with a more definitely decussate arrangement distally; the hydrocladial process is stout and all the internodes of the hydrocladium are thecate; the internodes are short for this genus, with the hydrotheca placed almost centrally; the septa are faint or absent. The pair of supracalcine and the single proximal nematophore are present on each internode; on the hydrocladial process there is a stationary one-chambered nematophore, a jointed, two-chambered one in the axil, and another near the distal end. There is one cauline nematophore between two successive hydrocladial processes in the same line.

*Gonosome*.—Not observed.

### ***Antennularia reversa*, new species**

Plate 17, Fig. 7

*Trophosome*.—Colony with stout main stem—up to 45 mm.—but no branches, without definite nodes. Hydrocladia in four series, irregularly decussate, with two series inclined to the one side and two to the other, so as to give somewhat of a biserial arrangement or appearance.

Hydrocladia long—up to 8 mm.—and slender, arising from a prominent process on the stem; divided into regular internodes by transverse nodes, all internodes thecate; the hydrotheca is much nearer the proximal than the distal end of the internode; the septa are faint or absent. There are two supracalcine nematophores and a mesial nematophore near the proximal, and one near the distal end of each internode; on the cauline hydrocladial process there is a short fixed nematophore, and also a movable one, as well as another at the axil of the process; there are nematophores on the stem, somewhat irregularly arranged, but there is usually at least one between each two successive processes in the same series.

*Gonosome*.—Not observed.

### ***Antennularia septata*, new species**

Plate 18, Fig. 8

*Trophosome*.—Stiff looking colonies—up to 10 cm.—grow in clusters of as many as 25. Stem, stout, straight, rigid, shows little or no sign of division into internodes. The hydrocladia are given off in regular alternation from the two sides of the stem, in the same plane, each from a distinct process of the stem. The hydrocladium is divided into short, nonthecate, alternating with longer, thecate internodes, the proximal internode being nonthecate; the hydrotheca is near the distal end of the internode. The septa are numerous and much pronounced; there is one septum near each end of each internode, and one at the base of the hydrotheca in the thecate internode. There are two supracalcine nematophores, and a median nematophore on each hydrocladial internode, one on the hydrocladial process, and one large cauline nematophore laterally placed between each two successive hydrocladia.

*Gonosome*.—Not observed.

### ***Antennularia tetraseriata* Fraser**

Plate 18, Fig. 9

*Trophosome*.—See description in Hydroids of the 1934 Allan Hancock Pacific Expedition, 1938, p. 59.

*Gonosome*.—(Not previously described). Gonangia are borne singly on the hydrocladial processes of the stem, scattered, without regular arrangement. There is a basal portion rapidly enlarging from the attachment, then rather an abrupt turn to the cylindrical distal portion,

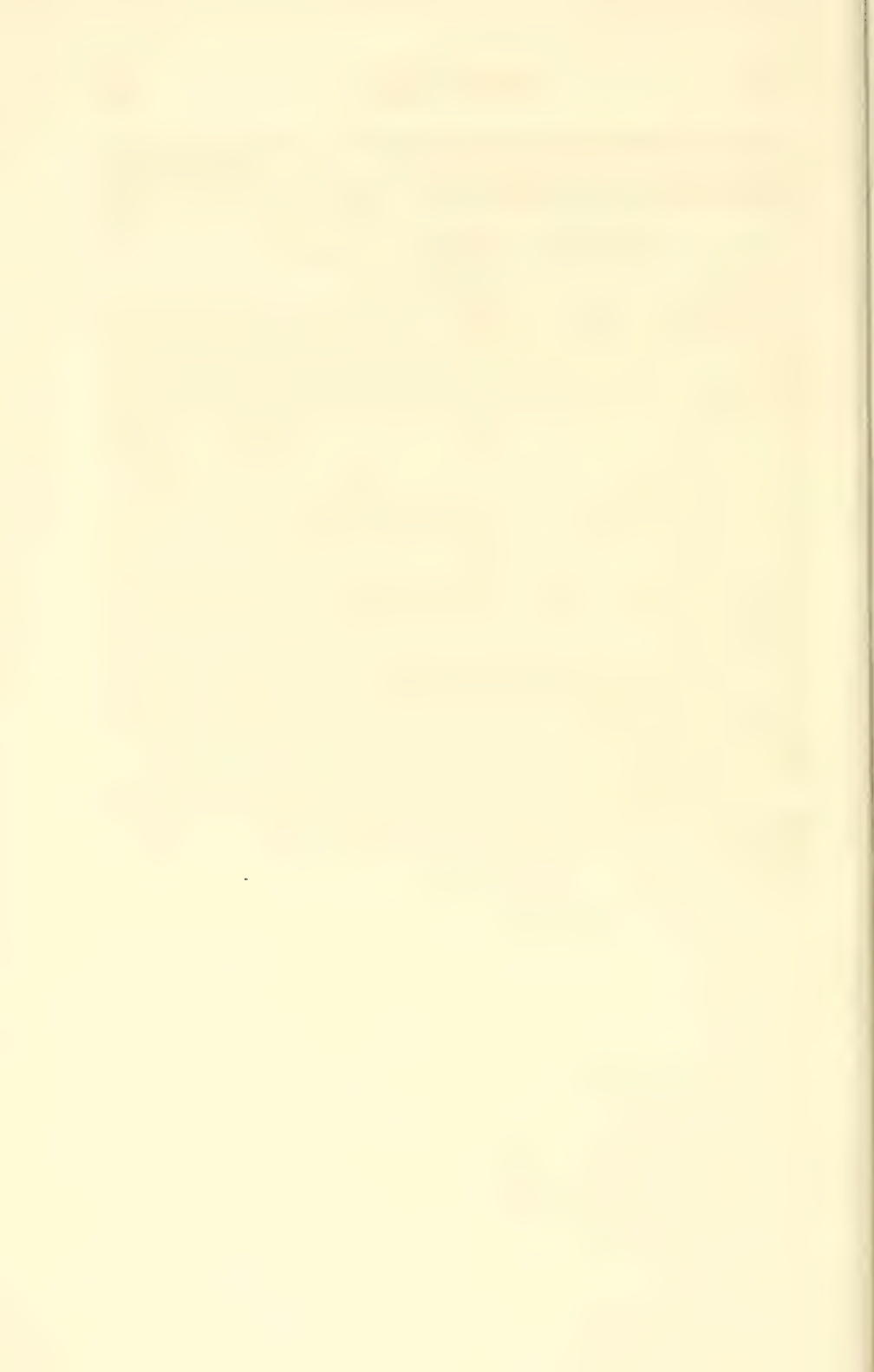
so that the adcauline side is distinctly concave, and the abcauline, distinctly convex; or, the gonangium may be nearly straight and then regularly obovate. The opening does not occupy all of the distal end.

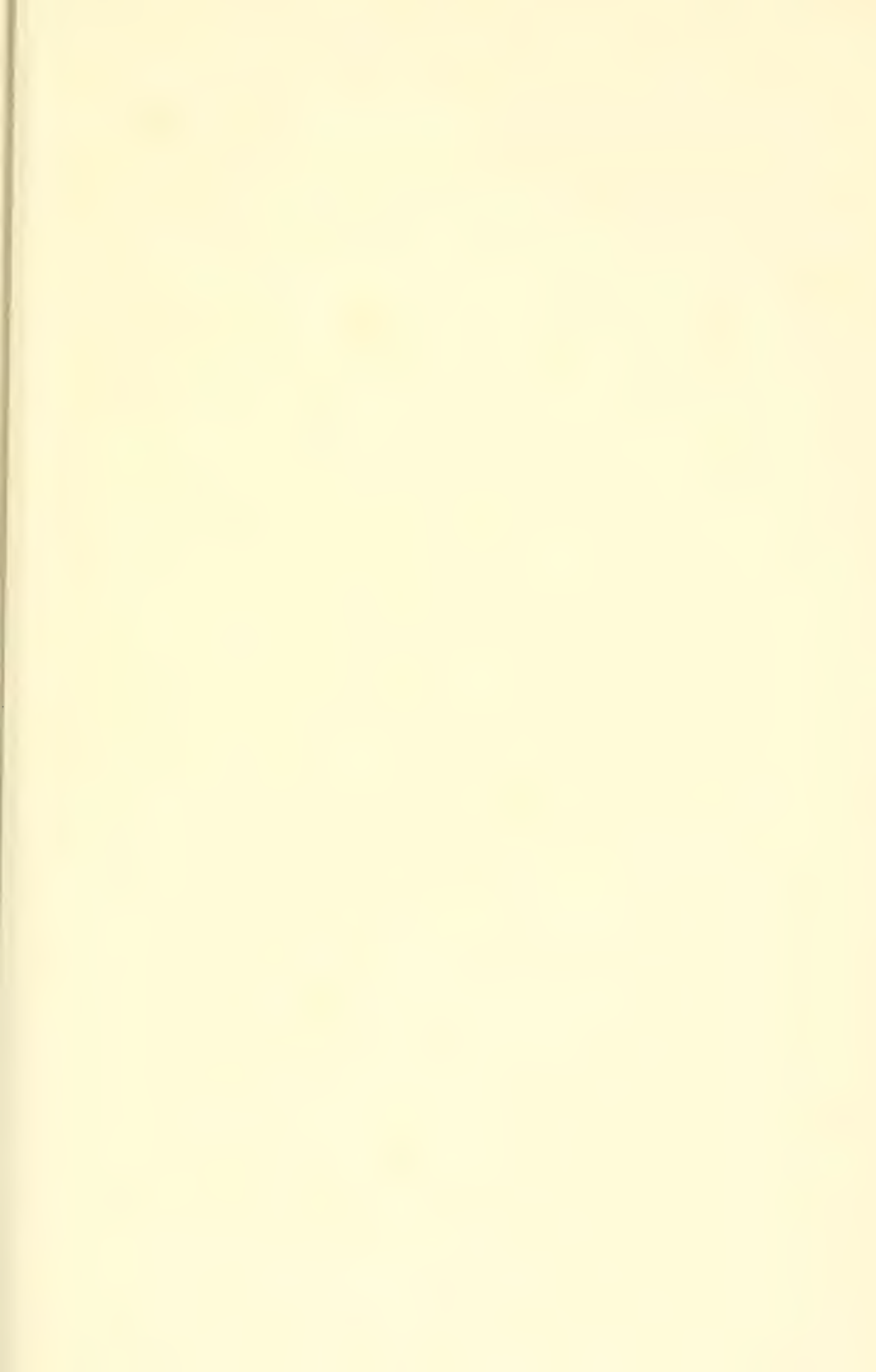
***Plumularia tenuissima*, new species**

Plate 18, Fig. 10

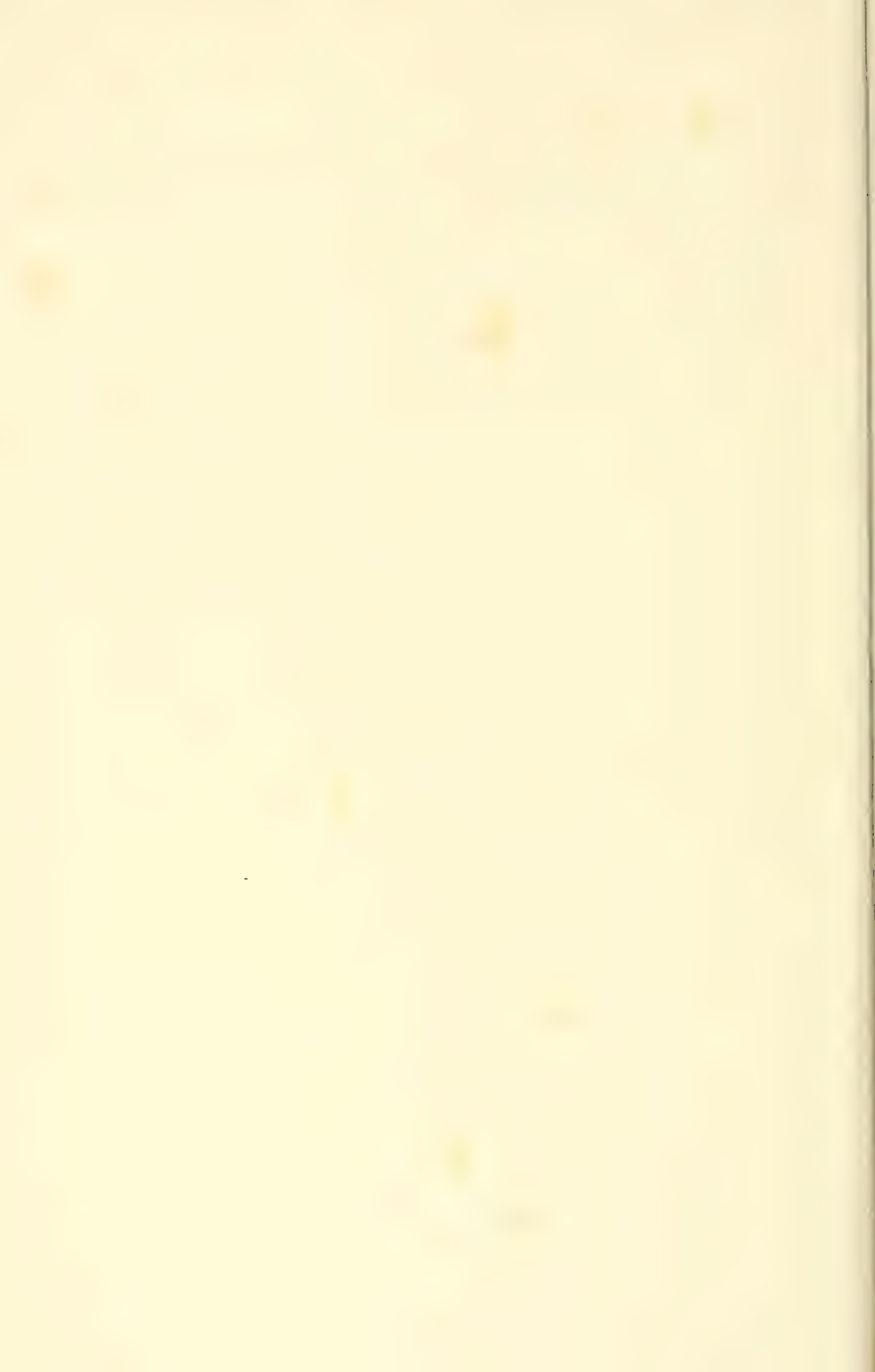
*Trophosome*.—Colonies growing from a stolon, somewhat loosely clustered—5 cm. Stem unbranched or very slightly and irregularly branched, very slender, divided into long internodes without ridges; each internode with a hydrocladium almost at its distal end, but the hydrocladia are not always strictly alternate; nematophores numerous, usually four to an internode besides the two that are on the hydrocladial process. Hydrocladia long—up to 6 mm.—and very slender, bearing at most four hydrothecae. Next to the hydrocladial process of the cauline internode, there is a short internode, with two ridges but without hydrotheca or nematophores; next to this is a much longer internode, also with a ridge near each end, with two nematophores but not bearing a hydrotheca; the third internode is thecate, the hydrotheca being nearly medially placed; it also has proximal and distal ridges, one, or sometimes two, mesial nematophores, below the hydrotheca, and two large supracalcine nematophores; after this the nonthecate and the thecate internodes follow in order, the former similar to the second and the latter to the third internode.

*Gonosome*.—Gonangia appear in some of the distal axils, on short pedicels, slender, nearly tubular, 1.0 mm. long, 0.1 mm. in diameter, smooth.









*(All the figures, unless otherwise indicated,  
have a magnification of 20 diameters.)*

## PLATE 16

Fig. 1. *Abictinaria expansa*

- a. Portion of branch to show arrangement of hydrothecae.
- b. Portion of colony to show branching and gonangia.

Fig. 2. *Aglaophenia longicarpa*

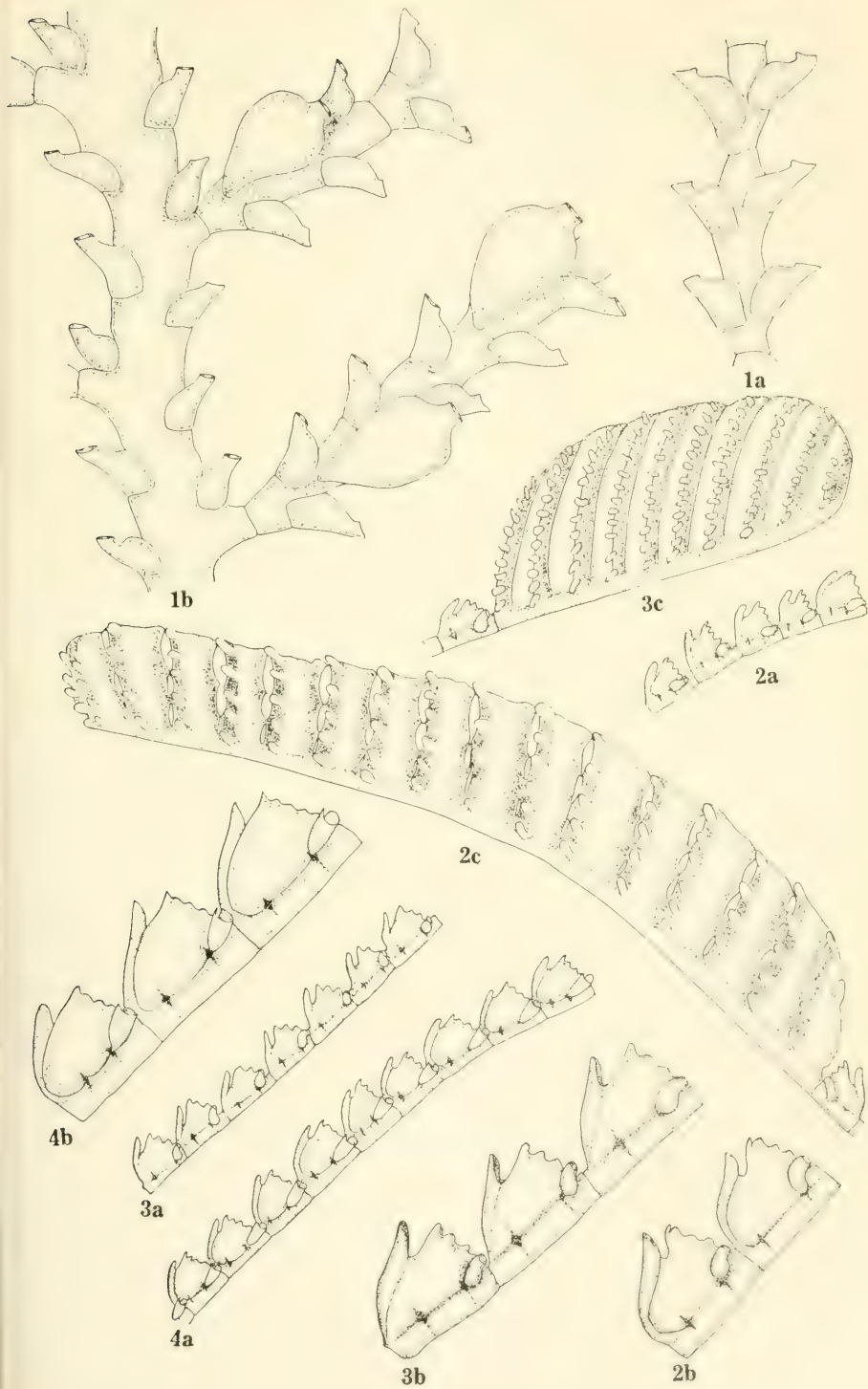
- a. Portion of hydrocladium to show hydrothecae.
- b. Two hydrothecae further enlarged ( $\times 40$ ).
- c. Corbula.

Fig. 3. *Aglaophenia pinguis*

- a. Portion of hydrocladium to show hydrothecae.
- b. Hydrothecae further enlarged ( $\times 40$ ).
- c. Corbula.

Fig. 4. *Aglaophenia propinqua*

- a. Portion of hydrocladium to show hydrothecae.
- b. Hydrothecae further enlarged ( $\times 40$ ).



## PLATE 17

Fig. 5. *Aglaophenia symmetrica*

- a. Portion of hydrocladium to show hydrothecae.
- b. Hydrothecae further enlarged ( $\times 40$ ).
- c. Corbula.

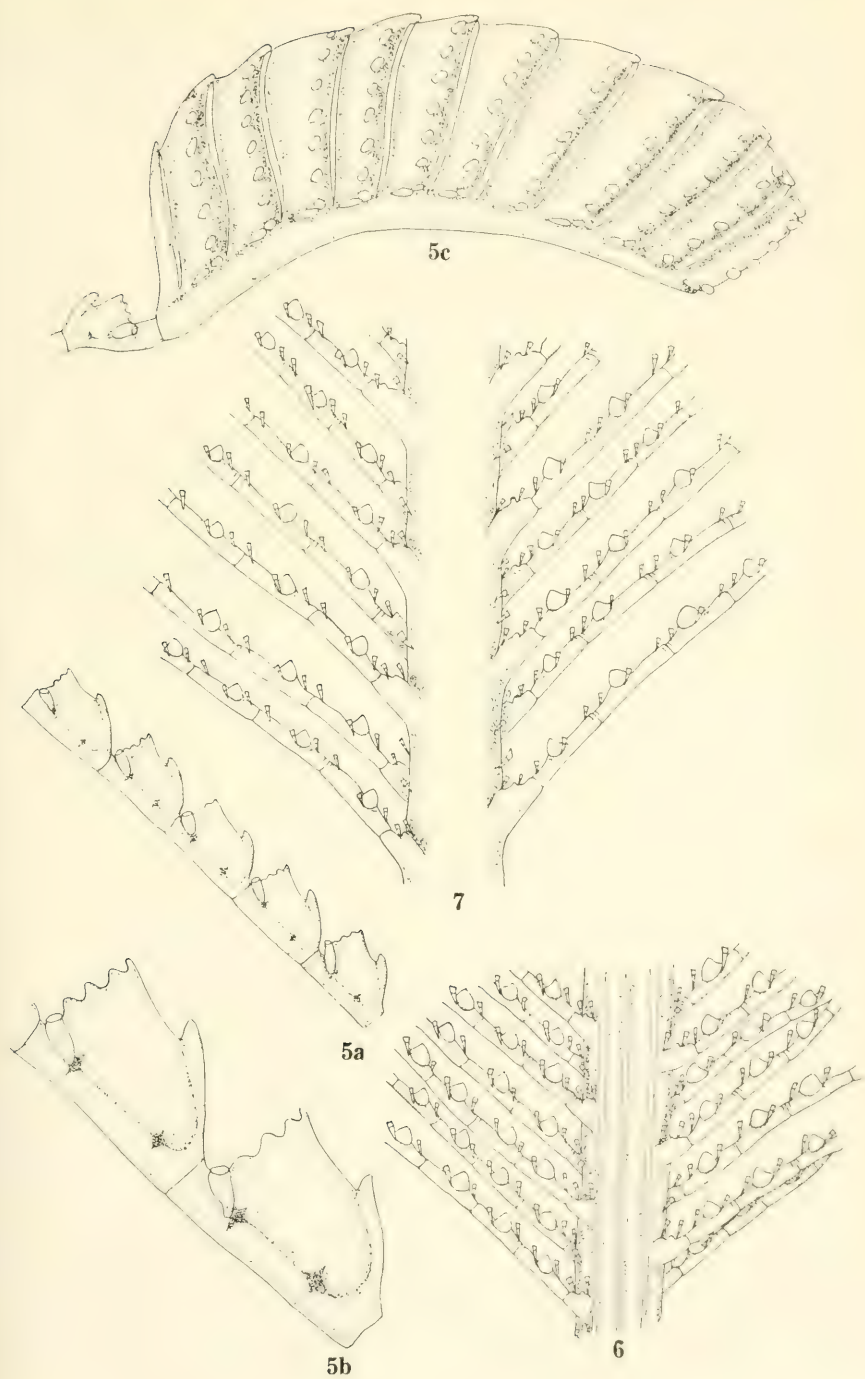
Fig. 6. *Antennularia compacta*

Portion of colony to show the arrangement of the hydrocladia and the hydrothecae.

Fig. 7. *Antennularia reversa*

Portion of colony to show arrangement of hydrocladia and hydrothecae.





## PLATE 18

Fig. 8. *Antennularia septata*

Portion of colony to show arrangement of hydrocladia and hydrothecae.

Fig. 9. *Antennularia tetraseriata*

Portion of colony to show gonangium.

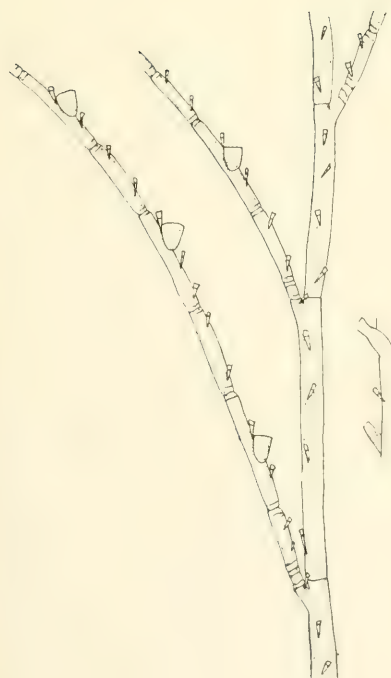
Fig. 10. *Plumularia tenuissima*

a. Portion of stem and hydrocladia.

b. Portion of colony showing gonangia.



8



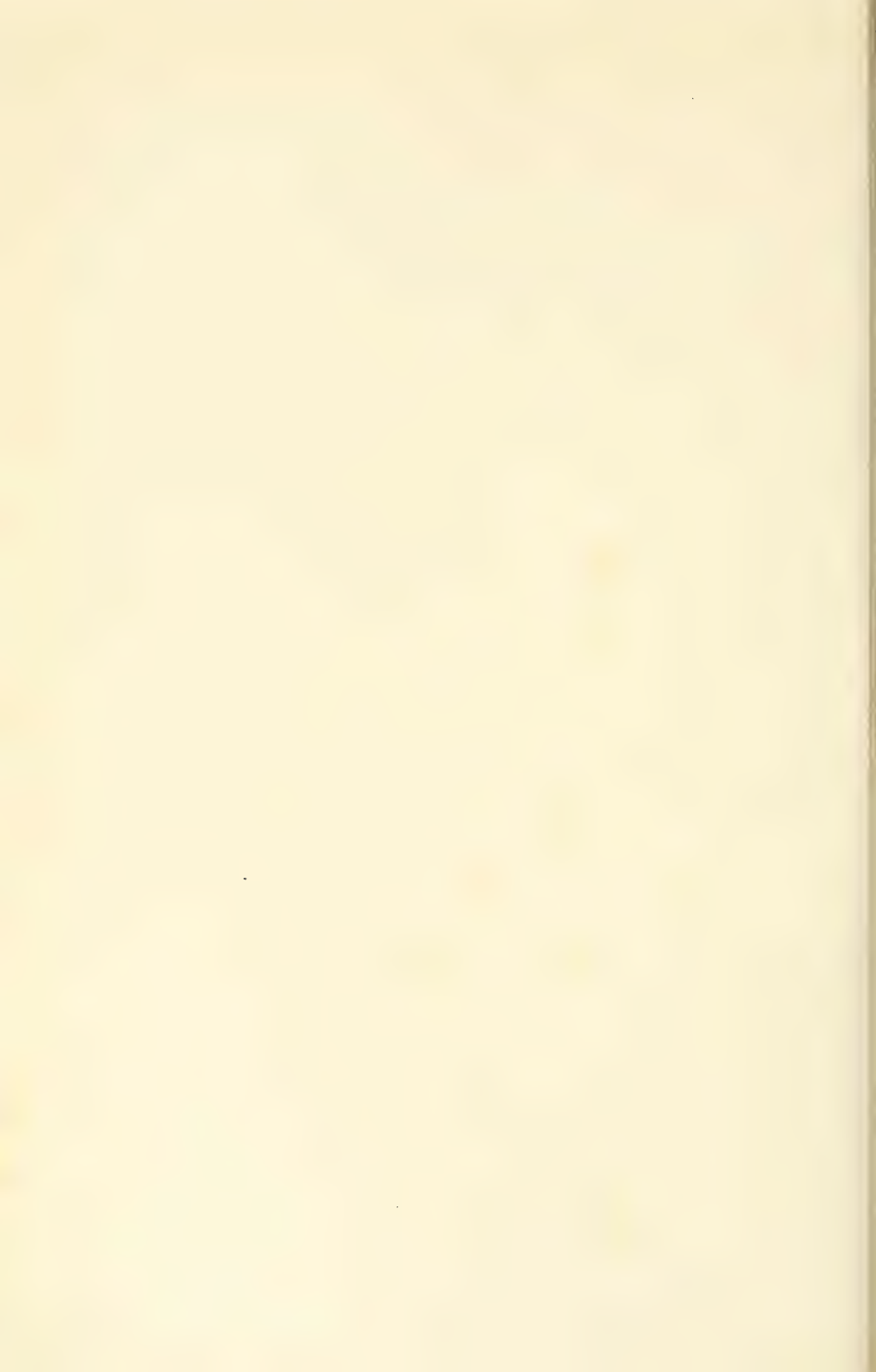
10a



9



10b



REPORTS ON THE COLLECTIONS OBTAINED BY ALLAN HANCOCK PACIFIC EXPEDITIONS OF  
VELERO III OFF THE COAST OF MEXICO, CENTRAL AMERICA, SOUTH AMERICA, AND GALA-  
PAGOS ISLANDS IN 1932, IN 1933, IN 1934, IN 1935, IN 1936, IN 1937, AND IN 1938.

## HYDROIDS OF THE 1932, 1933, 1935, and 1938 ALLAN HANCOCK PACIFIC EXPEDITIONS

*By* C. McLEAN FRASER



THE UNIVERSITY OF SOUTHERN CALIFORNIA PUBLICATIONS

ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 4, NUMBER 3

ISSUED OCTOBER 20, 1938

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THE UNIVERSITY OF SOUTHERN CALIFORNIA PRESS

LOS ANGELES, CALIFORNIA

# HYDROIDS OF THE 1932, 1933, 1935, and 1938 ALLAN HANCOCK PACIFIC EXPEDITIONS

C. McLEAN FRASER

Two papers have already appeared on the hydroids collected by the Allan Hancock Pacific Expeditions to the eastern tropical Pacific. The first one dealt with the hydroids collected in 1934 only, mainly because in that Expedition intensive hydroid collecting was a significant feature. That paper has been the basis for comparison in working on the material from the other expeditions. The second paper dealt with the collections made in 1936 and 1937, as these were largely confined to the Gulf of California. In the Expeditions of 1932, 1933, 1935, and 1938, exploration was carried on in much the same regions as in 1934, the main difference being that much of the coast of Peru was included as well. The hydroids from these four expeditions can be treated together readily in one paper. Although the hydroid collecting was, in the main, incidental, much interesting material was obtained.

Although the general area visited was much the same each year, the actual collecting stations differed very materially, and as that is so, it may help, to add to the list of locations given in the first paper, to satisfy the new distribution records.

## LOCATIONS

### Galapagos Islands

Marchena Island

North Bay

Tower Island

Darwin Bay

Daphne Major Island } Northwest of South Seymour Island

Daphne Minor Island }

Indefatigable Island

Conway Bay, on west coast

Gordon Rocks, on east coast

Barrington Island

Osborn Island

## Peru

San Juan Bay  
San Nicholas Bay  
Independencia Bay  
Chincha Islands  
Callao  
Hormigas de Afuera Islands  
Lobos de Afuera Islands

## Ecuador

La Libertad  
Manta Bay  
Cape San Francisco

## Colombia

Octavia Bay, north of Port Utria

## Panama

Pinas Bay  
Panama

## Costa Rica

Playa Blancas  
Parker Bay  
Salinas Bay  
Cocos Island  
Wafer Bay  
Nuez Island

## Mexico

Chacahua Bay  
Black Rock, south of Cape Corrientes  
Coronado Islands, just south of the United States-Mexico boundary.

I am indebted to Dr. Josephine F. L. Hart and Miss Ursula Dale for the drawings of the figures used.

Once more, acknowledgments are due to Captain G. Allan Hancock, his officers and ship's company, to all those who have been associated with them in these various expeditions, and to Dr. Irene McCulloch of the Department of Zoology, The University of Southern California, for her attention to the material after it was safely landed. It has meant many-sided co-operation that has been thoroughly appreciated.

## DISTRIBUTION

Ninety-nine species are listed from these four expeditions, of which all but 20 have been reported in one of the other papers. Of the 20, twelve are described as new. In the three papers, 213 species have been listed, 94 of them new.

The proportions of the numbers in the three main areas—A, oceanic islands, 29; B, mainland coast, south of Balboa, 46; C, mainland coast, north of Balboa, 56—have been changed somewhat, mainly because of the extension of the exploration area southward, to include Peru, as in Area B there is a greater proportionate number.

Forty-two species have not been reported outside this area. The distribution of the other 57 shows a marked parallelism to the distribution of those reported in the 1934 paper.

1934: South of Area B, 13 species, 13%; North of Area C, 52 species, 52%; North Atlantic, 77 species, 77%; 1932, 1933, 1935, 1938; South of Area B, 9 species, 15.8%; North of Area C, 31 species, 54.4%; North Atlantic, 43 species, 75.4%.

It is significant that even when the coast of Peru is included, there is still little affinity to the hydroids of the coast of Chile. The Humboldt Current must make a very definite demarcation. As far as hydroid distribution is concerned, there is nothing like it anywhere in the northeast Pacific.

## SPECIES AND DISTRIBUTION

## Family Clavidae

*Turritopsis nutricula* McCrady.—Chacahua Bay, 5-10 fathoms.

## Family Atractylidae

*Bimeria gracilis* Clark.—Bahia Honda, 3-5 fathoms; Parker Bay, 30 fathoms.

*Bimeria vestita* Wright.—Manta Bay, shore; Pinas Bay, 30-35 fathoms; Panama, shore; White Friars, 15-20 fathoms.

*Bougainvillia crassa* Fraser.—Panama, shore.

*Perigonimus gracilis* Fraser.—Octavia Bay, 35-40 fathoms.

*Perigonimus repens* Wright.—South and east of Daphne Major Island, 55 fathoms; Octavia Bay, 35-40 fathoms; Chacahua Bay, 5-10 fathoms.

*Perigonimus robustus* Fraser.—Black Rock, south of Cape Corrientes, 5-10 fathoms.

Family **Eudendridae**

- Eudendrium tenellum* Allman.—North of Hood Island, 20-40 fathoms.  
*Eudendrium tenue* A. Agassiz.—Octavia Bay, 35-40 fathoms; Secas Islands, 14 fathoms.

Family **Hydractinidae**

- Hydractinia longispina* Fraser.—Lobos de Afuera Islands, 12 fathoms.  
*Hydractinia multispina* Fraser.—Tagus Cove, 10 fathoms.  
*Hydractinia rugosa* Fraser.—Octavia Bay, 35-40 fathoms.

Family **Pennariidae**

- Pennaria tiarella* McCrady.—Cape San Francisco, 15 fathoms; Panama, shore.

Family **Campanularidae**

- Campanularia hincksi* Alder.—Off Daphne Major Island, 70-80 fathoms; north of Hood Island, 20-40 fathoms.  
*Campanularia urceolata* Clark.—4¾ miles east of Coronado Islands, 14 fathoms.  
*Clytia bakeri* Torrey.—Chacahua Bay, 5-10 fathoms.  
*Clytia coronata* (Clarke).—Secas Islands, 14 fathoms.  
*Clytia cylindrica* A. Agassiz.—Tagus Cove, 10 fathoms; south and east of Daphne Major Island, 85 fathoms; Independencia Bay, 10 fathoms; north of Gorgona Island, 10-20 fathoms; Secas Islands, 5-20 fathoms; off Nuez Island, 30-50 fathoms.  
*Clytia fascicularis* Fraser.—Callao, 5 fathoms.  
*Clytia irregularis* Fraser.—Tangola Tangola, 15-20 fathoms.  
*Clytia macrocarpa* Fraser.—South Bay, Lobos de Afuera Islands, 14-16 fathoms and 20-22 fathoms; Independencia Bay, 5 and 20 fathoms; Callao, 3 fathoms; Hormigas de Afuera Islands, 45 fathoms; San Nicholas Bay, 10-25 fathoms.  
*Clytia seriata* Fraser.—Tenacatita Bay, in lagoon.  
*Clytia universitatis* Torrey.—Chacahua Bay, 5-10 fathoms.  
*Eucopella caliculata* (Hincks).—South Bay, Lobos de Afuera Islands, 12 fathoms.  
*Eucopella everta* (Clark).—San Juan Bay, 15-20 fathoms; Lobos de Afuera Islands, shore.  
*Gonothyra gracilis* (Sars).—Tagus Cove, 10-20 fathoms; Independencia Bay, 5 fathoms; Callao, 5 fathoms; Parker Bay, 10 fathoms; off Nuez Island, 30-50 fathoms; Chacahua Bay, 5-10 fathoms.



*Gonothyraca serialis* Fraser.—La Libertad, 3-5 fathoms; Tenacatita Bay, in lagoon.

*Obelia commissuralis* (McCrary).—Wafer Bay, shore.

*Obelia dichotoma* (Linnaeus).—Tagus Cove, 10-20 fathoms; north of Gorgona Island, 10-20 fathoms.

*Obelia geniculata* (Linnaeus).—North end of Albemarle Island, 6-7 fathoms; Callao, 5 fathoms; San Juan Bay, 15-20 fathoms; Chacahua Bay, 5-10 fathoms.

*Obelia hyalina* Clarke.—Isabel Island, 10-15 fathoms.

*Obelia microtheca* Fraser.—Independencia Bay, 5 fathoms; La Libertad, 3-5 fathoms; Panama, shore.

*Obelia tenuis* Fraser.—Tagus Cove, 10-20 fathoms.

### Family Campanulinidae

*Lovenella nodosa* Fraser.—Chacahua Bay, 5-10 fathoms.

*Lovenella rugosa* Fraser.—Tenacatita Bay, 5 fathoms.

### Family Halecidae

*Halecium beani* (Johnston).—South and east of Daphne Major Island, 55 fathoms; Secas Islands, 12 fathoms.

*Halecium halecinum* (Linnaeus).—Secas Islands, 12 fathoms.

*Halecium insolens* Fraser.—Tenacatita Bay, in lagoon.

*Halecium nanum* Alder.—Secas Islands, 12 fathoms.

*Halecium regulare* Fraser.—Secas Islands, 14 fathoms.

*Halecium tenellum* Hincks.—South and east of Daphne Major Island, 55 fathoms; Secas Islands, 14 fathoms.

*Halecium tenue* Fraser.—Off Daphne Minor Island, 70-80 fathoms.

*Halecium tortum* Fraser.—Octavia Bay, 35-40 fathoms.

*Halecium washingtoni* Nutting.—San Juan Bay, 15-20 fathoms; Lobos de Afuera Islands, South Bay, 12 fathoms; off Nuez Island, 30-50 fathoms.

*Ophiiodissa alternata* Fraser.—Secas Islands, 14 fathoms.

*Ophiiodissa laxa* Fraser.—Secas Islands, 12 fathoms.

### Family Hebellidae

*Scandia corrugata* Fraser.—Octavia Bay, 35-40 fathoms; Secas Islands, 12 and 14 fathoms.

?*Scandia expansa* Fraser.—North of Gorgona Island, 10-20 fathoms.

*Scandia mutabilis* (Ritchie).—Octavia Bay, 35-40 fathoms; Secas Islands, 14 fathoms.



Family **Lafoeidae**

*Acryptolaria pulchella* (Allman).—Off Barrington Island, 73 fathoms; Sullivan Bay, 35-40 fathoms.

*Eucryptolaria pinnata* Fraser.—Off Daphne Minor Island, 70-80 fathoms.

*Filellum serpens* (Hassall).—Off Daphne Minor Island, 70-80 fathoms; Octavia Bay, 35-40 fathoms; Pinas Bay, 30-35 fathoms; Secas Islands, 12 fathoms; Salinas Bay, 20 fathoms.

*Lafoea intermedia* Fraser.—Off Daphne Minor Island, 70-80 fathoms.

*Lictorella cervicornis* Nutting.—Sullivan Bay, 35-40 fathoms; off Daphne Minor Island, 70-80 fathoms; off Barrington Island, 73 fathoms; north of Hood Island, 20-40 fathoms.

Family **Syntheticidae**

*Syntheticium gracile* Fraser.—North of Point Saint Elena, 8-10 fathoms; Port Utria, 2 fathoms; Pinas Bay, 35-40 fathoms; Secas Islands, 5-20 and 12 fathoms.

*Syntheticium projectum* Fraser.—Secas Islands, 12 fathoms.

*Syntheticium symmetricum* Fraser.—Port Utria, shore; Octavia Bay, 35-40 fathoms; Pinas Bay, 35-40 fathoms; Secas Islands, 12 fathoms.

Family **Sertularidae**

*Abietinaria amphora* Nutting.— $4\frac{3}{4}$  miles east of Coronado Islands, 14 fathoms.

*Pasya quadridentata* (Ellis and Solander).—North end of Albemarle Island, 6-7 fathoms.

*Sertularella ampullacea* Fraser.—Panama, shore; Secas Islands, 14 fathoms.

*Sertularella clausa* (Allman).—Independencia Bay, 5 fathoms.

*Sertularella conica* Allman.—South and east of Daphne Major Island, 55 fathoms; off Daphne Minor Island, 70-80 fathoms; Chinch Islands, 5 fathoms; San Juan Bay, 15-20 fathoms; Chacahua Bay, 5-10 fathoms.

*Sertularella erecta* Fraser.—North end of Albemarle Island, 6-7 fathoms.

*Sertularella formosa* Fewkes.—Secas Islands, 12 and 14 fathoms; Pinas Bay, 30-35 fathoms.

*Sertularella rugosa* (Linnaeus).—Lobos de Afuera Islands, 12 fathoms.

*Sertularella tenella* (Alder).—San Juan Bay, 15-20 fathoms; Octavia Bay, 35-40 fathoms.

*Sertularia anceps* Fraser.—Gordon Rocks, Indefatigable Island, 20 fathoms; Pinas Bay, 30-35 fathoms.

*Sertularia cornicina* (McCrary).—Gordon Rocks, Indefatigable Island, 20 fathoms.

*Sertularia dispar* Fraser.—North of Point Saint Elena, 8-10 fathoms.

*Sertularia exigua* Allman.—Tangola Tangola, 15-20 fathoms.

*Sertularia furcata* Trask.—North of Point Saint Elena, 8-10 fathoms.

*Sertularia operculata* Linnaeus.—Lobos de Afuera Islands, South Bay, 12 and 25-30 fathoms.

*Sertularia stookeyi* Nutting.—North of Point Saint Elena, 8-10 fathoms.

*Thuiaria simplex* Fraser.—Secas Islands, 14 fathoms.

*Thuiaria tubuliformis* (Markt.).—Shore, in all cases: Cartago Bay, Darwin Bay, Marchena Island, James Island, Conway Bay, Indefatigable Island, Osborn Island, Gardiner Bay, North Seymour Island, Port Utria, Octavia Bay, Parker Bay.

### Family Plumularidae

*Aglaophenia dubia* Nutting.—Off Daphne Minor Island, 70-80 fathoms.

*Aglaophenia longicarpa* Fraser.—Isabel Island, 10-15 fathoms.

*Aglaophenia prominens* Fraser.—Lobos de Afuera Islands, 25-30 fathoms;  $4\frac{3}{4}$  miles east of Coronado Islands, 14 fathoms.

*Aglaophenia rigida* Allman.—Playa Blancas, 3-5 fathoms.

*Aglaophenia struthionides* (Murray).— $4\frac{3}{4}$  miles east of Coronado Islands, 14 fathoms.

*Antennella avalonia* Torrey.—North end of Albemarle Island, 6-7 fathoms; Port Utria, 2 fathoms; Pinas Bay, 30-35 fathoms.

*Antennella gracilis* Allman.—Secas Islands, 12 fathoms.

*Antennularia irregularis* Fraser.—North of Gorgona Island, 10-20 fathoms; Octavia Bay, 35-40 fathoms.

*Antennularia tetraseriata* Fraser.—North of Gorgona Island, 10-20 fathoms; Octavia Bay, 35-40 fathoms.

*Hippurella longicarpa* Nutting.—Northwest of Charles Island, 250 fathoms.

*Lytocarpus philippinus* (Kirchenpauer).—Hood Island, 20 fathoms; James Island, 8 fathoms; La Libertad, shore; La Plata Island, 10 fathoms; Port Utria, shore; Secas Islands, 12 and 14 fathoms; Tenacatita Bay, in lagoon; Isabel Island, 10-15 fathoms.

*Monostaechas quadridens* (McCrary).—Secas Islands, 14 fathoms.

*Plumularia alternata* Nutting.—Secas Islands, 14 fathoms; Isabel Island, 10-15 fathoms.

- Plumularia corrugata* Nutting.—Off Daphne Minor Island, 70-80 fathoms.
- Plumularia lagenifera* Allman.—Independencia Bay, 5 and 20 fathoms; South Bay, Cerros Island, 10-15 fathoms.
- Plumularia magellanica* Hartlaub.—South Bay, Lobos de Afuera Islands, shore and 12 fathoms.
- Plumularia margaretta* (Nutting).—La Libertad, 3-5 fathoms.
- Plumularia micronema* Fraser.—Secas Islands, 14 fathoms; Parker Bay, 40 fathoms; Playa Blancas, 15 fathoms.
- Plumularia propinqua* Fraser.—Chacahua Bay, 5-10 fathoms; Isabel Island, 10-15 fathoms.
- Plumularia septata* Fraser.—Chincha Islands, 8 fathoms; Independencia Bay, 5 fathoms; Callao, off Penal Colony, 5 fathoms.
- Plumularia setacea* (Ellis).—Santa Maria Bay, 35-40 fathoms.
- Plumularia sinuosa* Fraser.—Tenacatita Bay, 5 fathoms.
- Plumularia tenuissima* Fraser.—Sulivan Bay, James Island, 35-40 fathoms.
- Streptocaulus pulcherrimus* Allman.—Barrington Island, 73 fathoms; north of Hood Island, 20-40 and 50-100 fathoms.

Of these 99 species, 20 are reported from this area for the first time, of which 8 species have been described previously. They are:—

- Clytia bakeri* Torrey.—Torrey, H. B. Hyd. of San Diego, 1904, II, p. 16.
- Eucopella caliculata* (Hincks) as *Campanularia caliculata*. Hincks, T. Ann. and Mag. Nat. Hist. (2), XI, 1853, p. 178.
- Acryptolaria pulchella* (Allman) as *Cryptolaria pulchella*, Allman, G. J. Challenger Hydroids, XXIII, 1888, p. 40.
- Abietinaria amphora* Nutting. Nutting, C. C. Am. Hyd., Part II, 1904, p. 119.
- Sertularella clausa* Allman. Allman, G. J. Challenger Hydroids, Part II, 1888, p. 54.
- Sertularia operculata* Linnaeus. Linnaeus, C. Syst. Nat., 1758, p. 808.
- Aglaophenia dubia* Nutting. = *Aglaophenia gracilis* Allman. Nutting, C. C. Am. Hyd., Part I, 1900, p. 92.
- Hippurella longicarpa* Nutting. Nutting, C. C. Am. Hyd., Part I, 1900, p. 84.

*Description of one new genus, twelve new species, and the gonosome of two other species.*

**?Perigonimus gracilis, new species**

Plate 19, Fig. 1

*Trophosome*.—Colony slender, sparsely branched, the branches commonly coming off at an acute angle with the stem and the pedicels similarly from the stem or branches; the largest colony observed was 5.5 mm. high. Perisarc never very thick, thins out to end almost imperceptibly below the base of the hydranth, the surface smooth or slightly wrinkled. Hydranth long and slender but considerably greater in diameter than the pedicel. Tentacles 10-12.

*Gonosome*.—Not observed.

Note.—It is quite possible that this is the species of *Perigonimus* that Hartlaub described and figured, as *Perigonimus* sp. in *Die Hydroiden der Magalhaensischen Region und Chilenischen Küste*, 1905, p. 532, as it bears some resemblance to his figure "O," but it also bears a resemblance to his figure "Ka," which, for some reason difficult to understand, he labels "(?) *Perigonimus repens* Wright."

**Perigonimus robustus Fraser**

Plate 19, Fig. 2

*Perigonimus robustus* FRASER. Hyd. of the 1934 Hancock Exp. 1938, p. 17.

*Trophosome*.—For description see original reference.

*Gonosome*.—Medusa-buds grow singly from the hydranth pedicels, a short distance below the hydranths themselves, with short, annulated pedicels. The medusa-bud reaches to, or a little above, the margin of the hydranth tube and is of much the same diameter as this margin.

**Hydractinia rugosa, new species**

Plate 19, Fig. 3

*Trophosome*.—Nutritive zooids, not closely placed, arise from an encrusting coenosarc that does not show any network at the surface; those most fully extended reach a height of nearly 2 mm. There are commonly eight tentacles; either four of these are much longer than the other four, or they are extended while the others are contracted, as, in the preserved material, this difference in size is definitely indicated.



*Gonosome*.—(Only female generative zooids observed.) The generative zooids are much smaller than the nutritive and are devoid of tentacles. The sporosacs form a whorl about half way to the base of the tentacles; each sporosac with four large ova. In several cases, a second whorl seems to be developing just distal to the main whorl.

*Other zooids*.—No other types of zooids were observed.

*Spines*.—The spines are numerous, large (some of them nearly 1.0 mm. high), and conspicuous; slightly tapering to a blunt point, with 4-6 prominent, rugose ridges, running longitudinally.

### ***Clytia macrocarpa*, new species**

Plate 19, Fig. 4

*Trophosome*.—Zooids may grow up singly, or colonies may appear, consisting of a stem and one to several branches. When branches are present they are never regularly or closely arranged, hence the colony is somewhat straggly. The branches and the pedicels bend abruptly near the origin, turning to form an acute angle with the stem, or even running almost parallel with it. The stem, branches, and pedicels are all slender; they are annulated for some distance at both extremities and some of the terminal pedicels are annulated throughout or nearly so. Hydrotheca rather broadly campanulate, with 9-10 distinct, sharp teeth.

*Gonosome*.—Gonangia of great length, approximately two and one-half times the length of the hydrothecae, growing from the stolon, from the main stem, or from the branches, with rather long pedicels, annulated throughout; elongate elliptical, narrowed slightly just below the margin; surface with slightly wavy lines running from base to margin, or there may be wavy, longitudinal corrugations.

### ***Lovenella rugosa*, new species**

Plate 19, Fig. 5

*Trophosome*.—Minute colonies consisting of one, two, three, or four zooids, growing from a stoloniferous network, over the surface of seaweed. If there are more than one zooid in the colony, the second grows out from the pedicel of the first, slightly below the base of the hydrotheca; the pedicel of the second one curves in the proximal portion so that it continues almost in line with the first; if there is a third zooid, it springs from the second as the second from the first, and a fourth may develop likewise. When there are four zooids in the colony, it may

reach a height of 3 mm. All of the pedicels are regularly corrugated throughout; these may be shallow to give a wrinkled appearance. The turbinate hydrotheca has nine or ten segments in the operculum.

*Gonosome*.—The gonangium grows from the stolon, on a short corrugated pedicel; it is large as compared with the size of the hydrotheca, almost 1.0 mm. in length, shaped like half of an ellipse, the distal end being truncated. There is a single medusa in the gonangium, the height being greater than the transverse diameter. The one in the specimen described has four radial canals and four spherical tentacle bulbs, visible through the gonangium.

### **Halecium tenue**, new species

Plate 20, Fig. 6

*Trophosome*.—Colony slender, up to 12 mm. in height; stem usually simple, but occasionally, slightly fascicled; it does not form a continuous axis for the colony. There is a long pedicellate portion for each hydrophore, and then just proximal to the hydrophore another pedicel is given off for the next hydrophore. Commonly the hydrophore is duplicated one or more times, with a varying length of pedicel between, or a branch, similar to the main stem, may grow out of the hydrophore. There are seldom any nodes or evidences of annulation. The rim of the hydrophore is slightly but distinctly flaring.

*Gonosome*.—All of the gonangia that were not empty were female. It may be that male and female are similar in shape and size. The gonangium is biconvex, 0.75 mm. long, 0.5 mm. in the greater diameter, and 0.25 mm. in the lesser, with a very short pedicel. It may appear on the stolon or any part of the stem.

### **Ophiodissa alternata**, new species

Plate 20, Fig. 7

*Trophosome*.—Colony reaching a height of 8 mm., but usually much less, with a slight tendency to fasciculation in the larger colonies, growing from an unbranched stolon (in this instance, creeping over the hydroid *Lytocarpus philippinus*); branches, if present, few and scattered irregularly. Stem zigzag, as the pedicel of each hydrophore comes out from near the distal end of the previous pedicel, and the pedicels alternate from side to side. Each pedicel has a double annulation near the proximal end; hydrophore distinctly flaring.



Tentacular organs quite large, commonly one to each pedicel, a short distance below the origin of the following pedicel. None was observed on the stolon.

*Gonosome*.—Gonangia appear almost sessile, attached to the hydrophore pedicels, to the internodes or to the stolon; obovate, with eight or nine strongly crested, transverse rugosities.

### ?*Scandia expansa*, new species

Plate 20, Fig. 8

*Trophosome*.—Zooids growing singly from a creeping stolon. The hydrotheca does not vary much in size, just short of 1.0 mm. in length and 0.3 mm. in diameter, but the length of the pedicel varies from the same length as the hydrotheca to about one fourth of its length. The pedicel has a definite annulation at the base, and in most cases this is the only one; occasionally, there are one or two others near the middle. The surface of the hydrotheca is gently corrugated on the outside, but on the inside the ridges come to a sharp edge that is very evident on looking in from the margin. The margin is entire but flares distinctly.

*Gonosome*.—Not observed.

As there was no gonosome present it is not possible to tell whether this is *Scandia* or *Hebella*. The definite diaphragm ensures it a place in the Hebellidae.

### Genus *EUCRYPTOLARIA*, new genus

*Trophosome*.—Stem and much of the branches consist of a central tube, giving rise to hydrothecae that are partly adnate, surrounded by a series of more slender peripheral tubes, not bearing hydrothecae, but bearing numerous nematophores.

*Gonosome*.—Unknown.

### *Eucryptolaria pinnata*, new species

Plate 20, Fig. 9

*Trophosome*.—Colonies up to 4 cm. in length, consisting of a central axis, with numerous short branches, pinnately arranged but subopposite in position. In the basal portion of the stem the hydrothecae come off in two rows, nearly in the same plane and there are several peripheral

tubes, with no very definite arrangement of the nematophores, although there is usually a nematophore near the base of each hydrotheca. On the distal portion of the stem and branches, there are still two rows of hydrothecae but they are not so nearly in the same plane; the peripheral tubes are much reduced in number. The nematophores show up very well here, at the base of the hydrothecae. The hydrothecae are small, nearly tubular but the tube is regularly curved so that the margin is parallel to the stem or branch, adnate for approximately half the length.

*Gonosome*.—Not observed.

### ***Sertularella clausa* (Allman)**

Plate 20, Fig. 10

*Sertularia clausa* ALLMAN, Challenger Hyd., Part II, 1888, p. 54.

*Sertularella clausa* NUTTING, Am. Hyd., Part II, 1904, p. 93.

*Trophosome*.—Colony reaching a maximum height of 23 mm., slightly and irregularly branched; branches like a portion of the main stem, but they come off abruptly with a pronounced constriction at the origin. Sometimes the basal internode of the branch is slightly wavy in outline. The nodes are oblique and the internodes turn to the right and to the left alternately, making the branch slightly zigzag. One hydrotheca is given off from each internode, near its distal end. The hydrotheca is slightly curved, nearly tubular, but slightly tumid in the lower portion, approximately one-half free, surface smooth. Margin with four low teeth; operculum with four well-defined flaps.

*Gonosome*.—(Not previously described.) Gonangium arises from the main stem or branch, with constricted base similar to that of the branch, and a very short, tapering pedicel; ovate, with a distinct neck and four low, blunt, irregular teeth on the margin; sometimes there is a tendency to corrugation in the distal third, the corrugations being low and rounded.

### ***Sertularella erecta*, new species**

Plate 21, Fig. 11

*Trophosome*.—Stem simple, usually unbranched, rather rigid, arising from a stolon to a height of 20 mm. Nodes scarce and irregularly placed, or absent. Hydrothecae appear in very regular alternation on the two sides of the stem, nearly one half of the adcauline side is adnate. The basal portion is slightly turgid, the distal portion is turned outward, nearly at right angles; the adcauline side of this portion is con-

cave, the abcauline, convex, so that the margin is nearly horizontal; margin with three teeth, the one on the adcauline side is low and blunt, the other two, sharper; operculum of three flaps.

*Gonosome*.—Not observed.

Note.—This species has a hydrotheca and a hydrothecal arrangement resembling that of *S. quadrifida* Hartlaub but the habitus is quite unlike that of this species.

### ***Aglaophenia prominens*, new species**

Plate 21, Fig. 12

*Trophosome*.—Colony (terminal fragment 20 mm.) slender, with hydrocladia up to 2.5 mm. in length, and at the most ten hydrothecae. Nodes of the stem oblique but usually indistinct. Hydrocladia alternate, those of the two sides making an angle of approximately  $120^\circ$  with each other; nodes of the hydrocladia readily visible but not very pronounced. The hydrotheca occupies practically the whole length of the internode, but is attached for only approximately the basal third; the remainder stands out distinctly and the separation is greater just next to the attachment. There are no distinct transverse septal ridges but there is a pronounced ridge running up from the base, near the face, to mark off the mesial nematophore. There are nine teeth on the margin; the median tooth, not recurved, is very similar to the one on each side of it, each deeply cut and sharply pointed; there is a large rounded indentation between the first and second laterals, the second tooth being also rounded; the third and fourth pairs are also rounded, the third being less than the second and the fourth less than the third. The mesial nematophore is short, far from reaching to the margin of the hydrotheca and projecting but little; the supracalcine nematophores are short, scarcely reaching the margin.

*Gonosome*.—The corbula is short and stout, with six pairs of leaves. There is one hydrotheca between the corbula and the base of the hydrocladium.

### ***Plumularia micronema*, new species**

Plate 21, Fig. 13

*Trophosome*.—Colony 35 mm., slender, unbranched or loosely and irregularly branched; stem divided into regular internodes by transverse nodes. Each internode bears a hydrocladium near the distal end, the hydrocladia alternating right and left in the same plane. The proxi-

mal internode in the hydrocladium, which is short, with a transverse node proximally and an oblique node distally, does not bear a hydrotheca, but all the other internodes are thecate. The hydrotheca is placed near the distal end of the internode and often overtops it; it is almost as broad as it is deep. The nematophores are very small; there is none on the proximal internode of the hydrocladium, but there is a median on each of the others, and two supracalycine nematophores with each hydrotheca; they are so small that they do not reach nearly to the margin of the hydrotheca. There is a nematophore on each hydrocladial process of the stem.

*Gonosome*.—Gonangia very small, nearly spherical, arising from the hydrocladial process of each internode for some considerable distance along the stem.

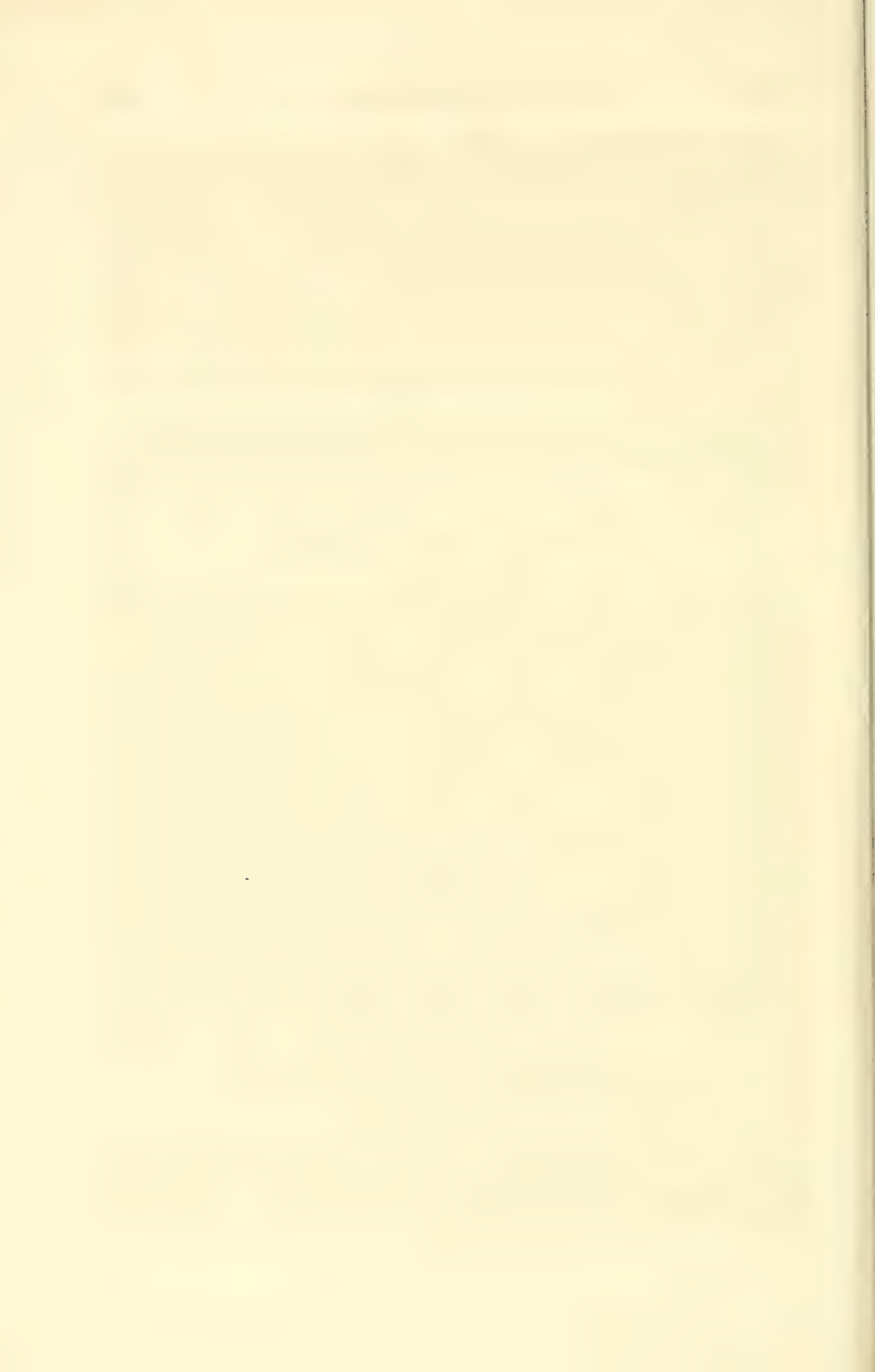
### ***Plumularia septata*, new species**

Plate 21, Fig. 14

*Trophosome*.—Colony reaching a maximum height of 12 cm., much branched, the branches coming out from all sides of the stem, giving a loose, bottle brush effect; the branches are more slender than the stem, usually less than 1.0 cm. long. The internodes of the stem and, even more so, the internodes of the branches are strongly septate; a septum near each end and one below the origin of the process from which the branch or the hydrocladium is given off. The hydrocladia approach a pinnate arrangement but as they come off the face of the stem, two in succession form an angle of less than  $90^\circ$ , and as sometimes they are nearly opposite, and at other times definitely alternate, there is not much regularity; they are short, never bearing more than three hydrothecae and more often two or even one. Nonthecate and thecate internodes alternate, the proximal being nonthecate. The nonthecate internode has a strong septum near each end; the thecate has a septum near the base, one between that and the base of the hydrotheca, and one at the base of the hydrotheca. There is a nematophore on the body of each internode on the stem and branch and one at the base of the hydrocladial process; there is a median nematophore on each hydrocladial internode and two supracalycine nematophores with each hydrotheca.

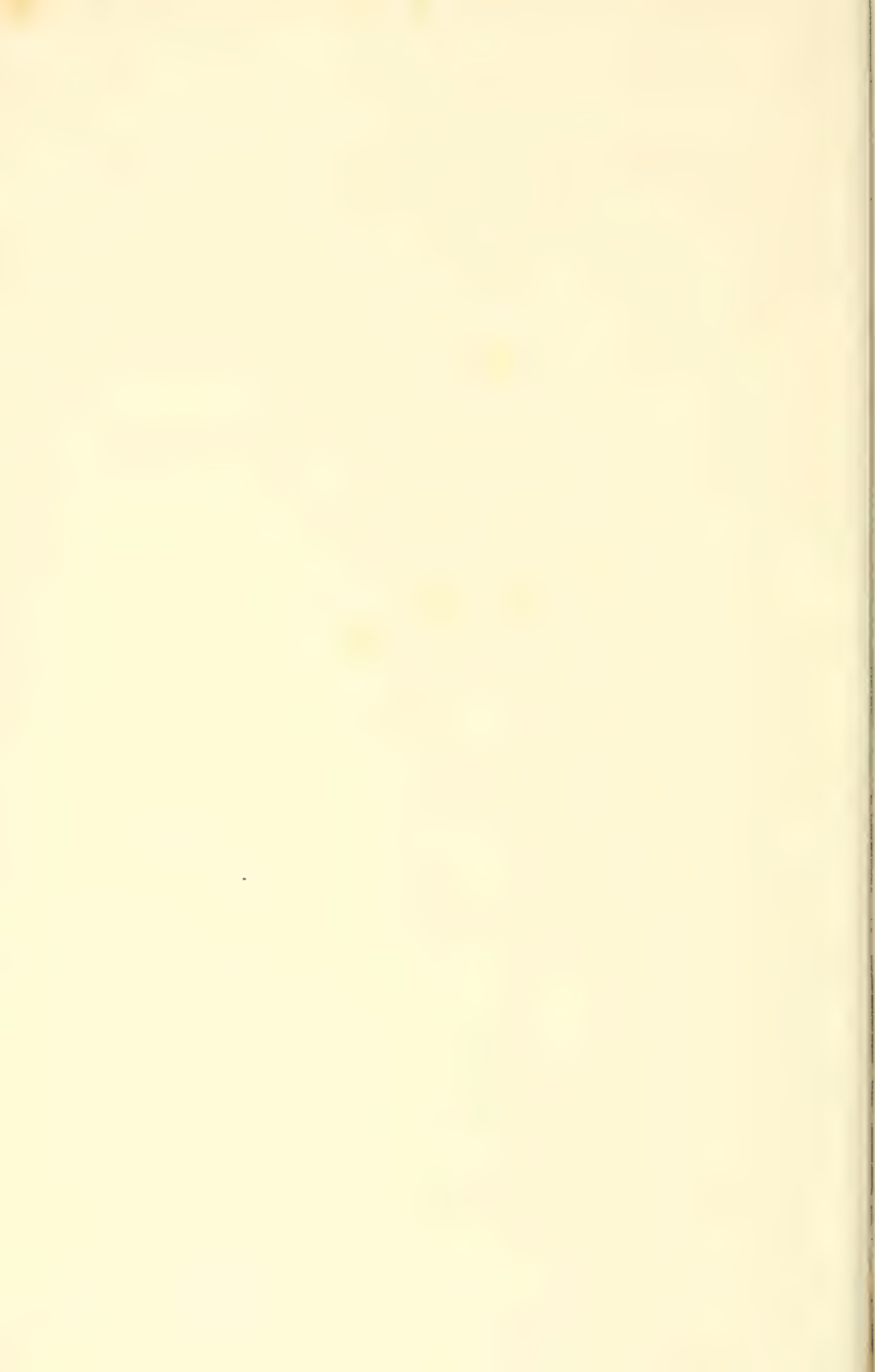
*Gonosome*.—The gonangia grow from the branches, one on each internode, the attachment being at the base of the hydrocladial process; they are elongated oval, the distal end extending to form a bottle neck; the male is longer and more slender than the female.









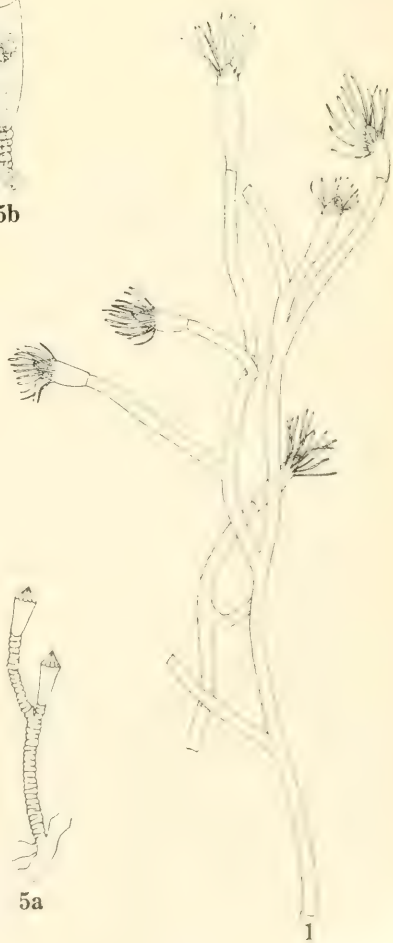
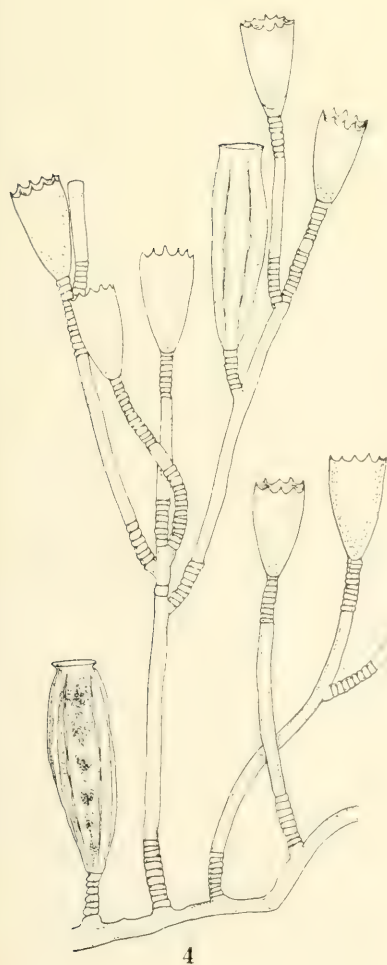
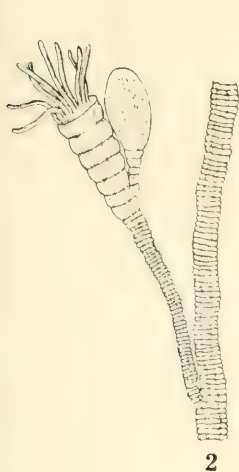


## EXPLANATION OF PLATES

All figures have a magnification of 20 diameters  
unless it is otherwise indicated.

## PLATE 19

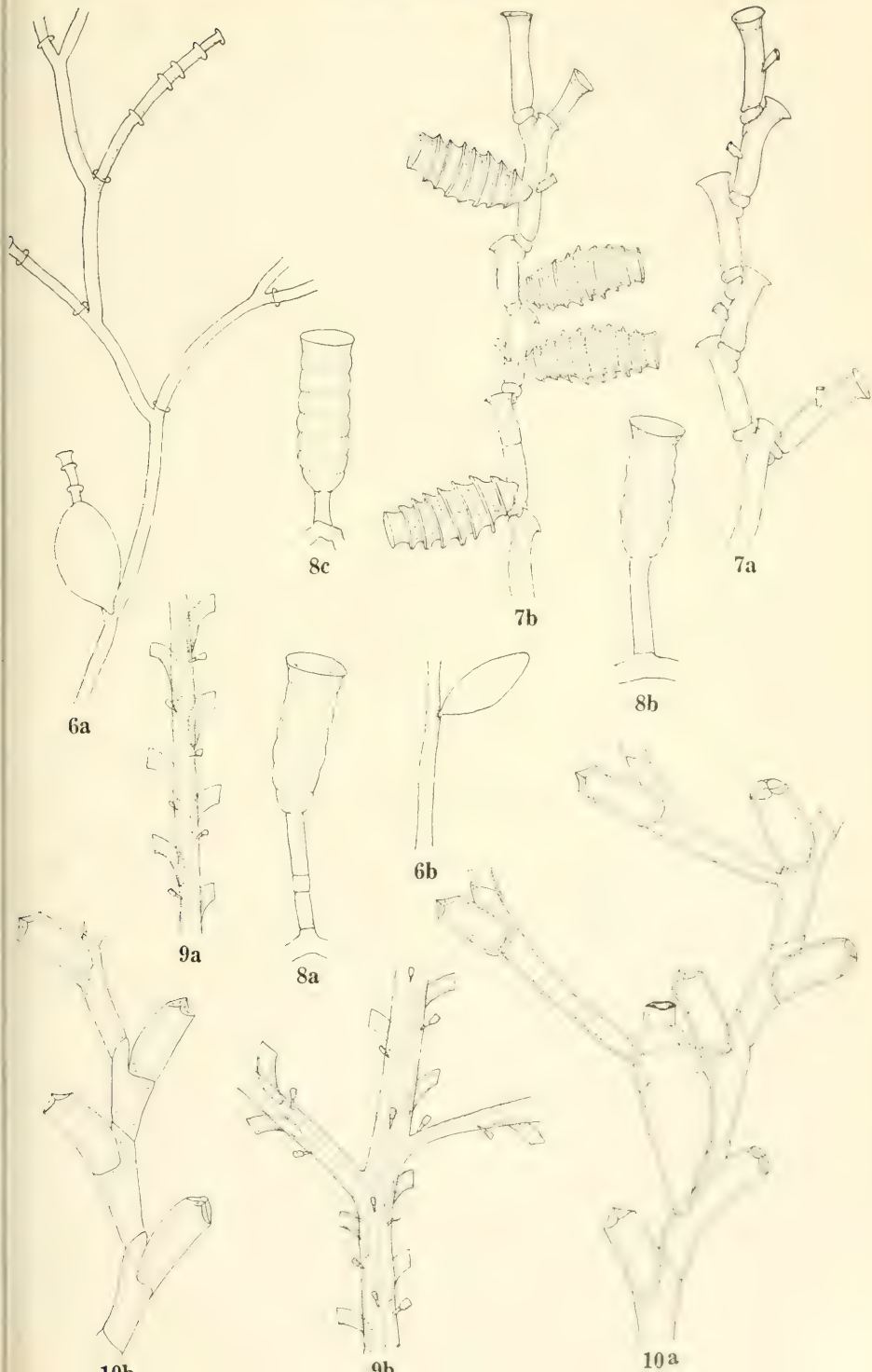
- Fig. 1. *Perigonimus gracilis*  
Portion of colony showing branching and hydranths.
- Fig. 2. *Perigonimus robustus*  
Portion of colony showing medusa-bud.
- Fig. 3. *Hydractinia rugosa*  
Portion of colony showing nutritive zooids, female generative zooids, and spines.
- Fig. 4. *Clytia macrocarpa*  
Colony showing mode of branching, hydrothecae and gonangium.
- Fig. 5. *Lovenella rugosa*  
a. Two hydrothecae.  
b. Gonangium.





## PLATE 20

- Fig. 6. *Halecium tenue*  
a. Colony showing hydrophore arrangement and face view of gonangium.  
b. Side view of gonangium.
- Fig. 7. *Ophiodissa alternata*  
a. Portion of colony to show hydrophore arrangement and tentacular organs.  
b. Portion of colony showing gonangia.
- Fig. 8. *Scandia expansa*  
a, b, and c. Hydrothecae.
- Fig. 9. *Eucryptolaria pinnata*  
a. Portion of main stem.  
b. Portion of branch.
- Fig. 10. *Sertularella clausa*  
a. Portion of stem showing branching, hydrothecae and gonangium.  
b. Portion of branch.

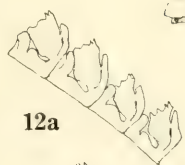


## PLATE 21

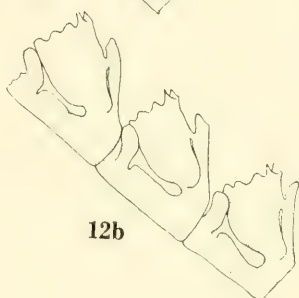
- Fig. 11. *Sertularella erecta*  
Portion of stem showing arrangement of hydrothecae.
- Fig. 12. *Aglaophenia prominens*  
a. Portion of hydrocladium showing hydrothecae.  
b. Portion of hydrocladium further enlarged ( $\times 40$ ).  
c. Face view of hydrotheca ( $\times 40$ ).  
d. Corbula.
- Fig. 13. *Plumularia micronema*  
a. Portion of stem with hydrocladia and hydrothecae.  
b. Two hydrothecae further enlarged ( $\times 40$ ).  
c. Portion of colony showing gonangia.
- Fig. 14. *Plumularia septata*  
a. Portion of stem with hydrocladia and hydrothecae.  
b. Portion of colony with gonangia.



11



12a



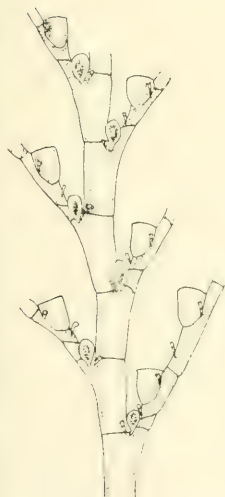
12b



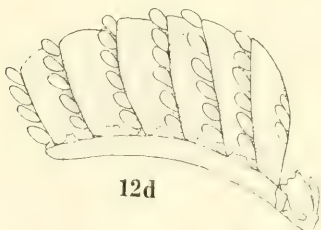
13a



13b



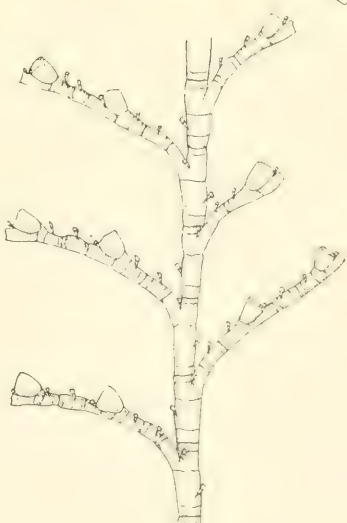
13c



12d



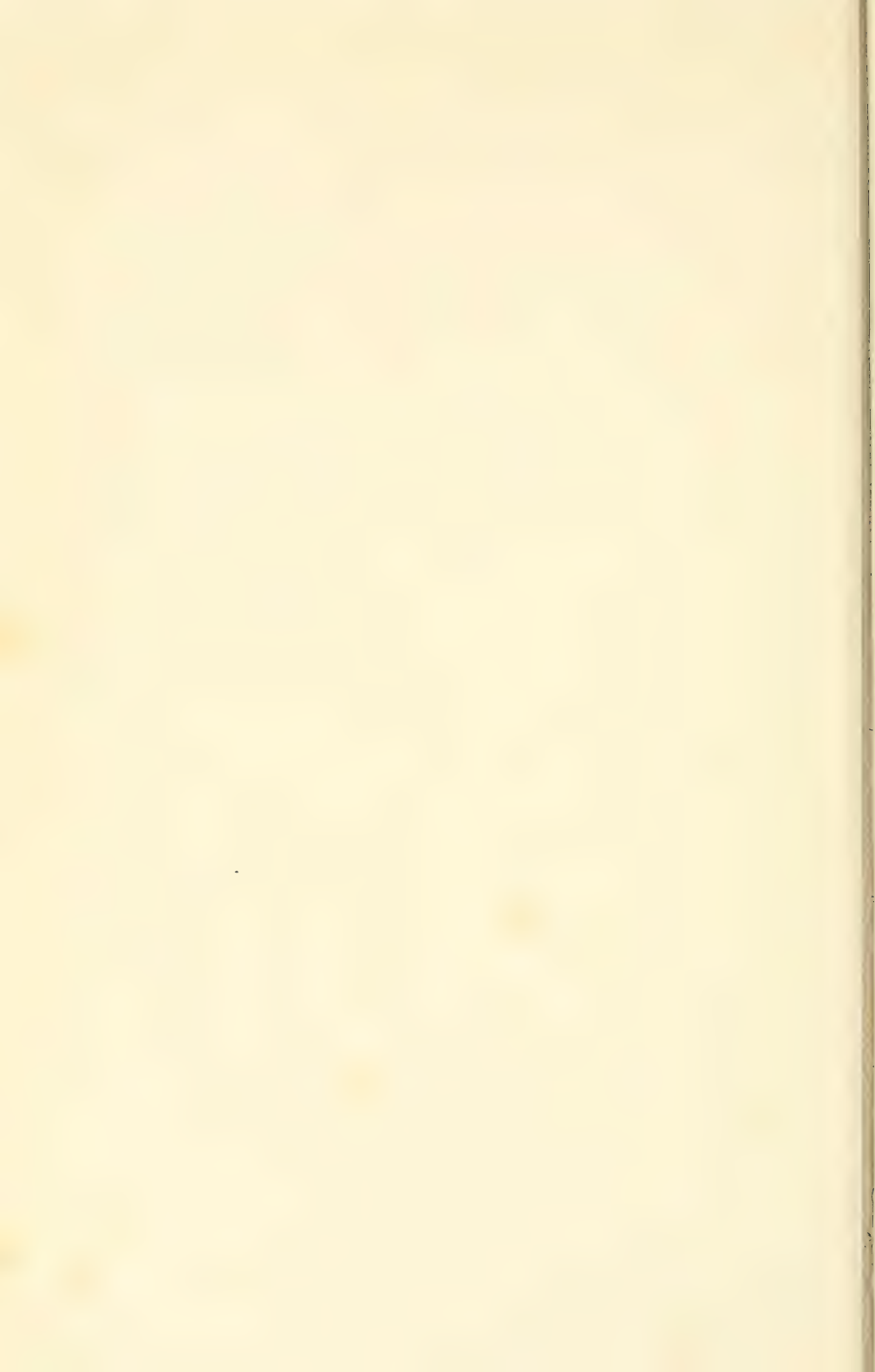
12c



14a



14b



REPORTS ON THE COLLECTIONS OBTAINED BY ALLAN HANCOCK PACIFIC EXPEDITIONS OF  
VELERO III OFF THE COAST OF MEXICO, CENTRAL AMERICA, SOUTH AMERICA, AND GALA-  
PAGOS ISLANDS IN 1932, IN 1933, IN 1934, IN 1935, IN 1936, IN 1937, AND IN 1938.

DISTRIBUTION OF THE HYDROIDS IN THE  
COLLECTIONS OF THE  
ALLAN HANCOCK EXPEDITIONS

*By* C. McLEAN FRASER



THE UNIVERSITY OF SOUTHERN CALIFORNIA PUBLICATIONS

ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 4, NUMBER 4

ISSUED FEBRUARY 6, 1939

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THE UNIVERSITY OF SOUTHERN CALIFORNIA PRESS

LOS ANGELES, CALIFORNIA

DISTRIBUTION OF THE HYDROIDS IN THE  
COLLECTIONS OF THE  
ALLAN HANCOCK EXPEDITIONS

C. McLEAN FRASER

Three papers on the Hancock hydroids have appeared, one on those collected in 1934, one on those in 1936 and 1937, and one on those in 1932, 1933, 1935, and 1938. In the first paper some attention was given to general distribution; in the other two little consideration was given to it, apart from the distribution records. Since several species are recorded in these two papers that were not in the first one, it may be an opportune time to review the situation to date, in the area covered by the expeditions, viz., the east coast of the Pacific from the northern boundary of Mexico to the southern boundary of Peru, and the Oceanic islands related to this area.

Before 1932, when the first Hancock hydroids were collected, very little was known of the hydroid fauna of this area. In 1891, the United States Fish Commission Steamer *Albatross* did some dredging off the Mexican and Central American coasts and S. F. Clarke recorded ten species from the material, all within one hundred miles of Panama, except one from the coast of Nicaragua. In 1904 and 1905, the *Albatross* did some dredging at widely distant stations in this general area and from the material Clarke recorded twelve species. Two species were common to the two collections, so there were 20 recorded in all. These were:

Eudendrium sp.  
Pennaria pacifica Clarke  
Campanularia obliqua Clarke  
Obelia castellata Clarke  
Obelia striata Clarke  
Obelia sp.  
Campanulina denticulata Clarke  
Halecium argenteum Clarke  
Halecium gracile Bale  
Acryptolaria conferta (Allman)  
Acryptolaria pulchella (Allman)  
Lafoea convallaria Allman  
Lafoea gracillima (Alder)  
Lictorella geniculata Clarke



*Sertularella tropica* Hartlaub  
*Thuiaria tubuliformis* (Marktanner)  
*Aglaophenia struthionides* (Murray)  
*Cladocarpus distomus* Clarke  
*Plumularia helleri* Hincks  
*Zygophylax chazaliei* Versluys

These all came from deep water; only two of the hauls were from a depth less than 300 fathoms and one of them was at a depth of 2,845 fathoms in 13° 11.6' S. and 78° 18.3' W. It is little wonder then that only four of these species, *Acryptolaria pulchella*, *Halecium gracile*, *Thuiaria tubuliformis*, and *Aglaophenia struthionides*, appeared in the Hancock collections, where nearly all of the material has been taken at less than 100 fathoms.

Of the 20 species, two were described but not named, eight were described as new, one is confined to the tropical Pacific, six have been reported from the Atlantic, two from the northeast Pacific, and one from both the Atlantic and the Northeast Pacific.

Nutting, in his monographs on American Hydroids, records two species from this area, *Aglaophenia octocarpa* Nutting, from Cape San Lucas, and *Lytocarpus philippinus* (Kirchenpauer), from Panama. He quotes Kirchenpauer who records *Plumularia oligopyxis* Kirchenpauer from the west coast of South America. This is so indefinite that it is impossible to say if it should be included in this area, and hence it is probably better to leave it out.

In 1930, Anna B. Hastings recorded a new species, *Zanclaea protecta*, from James Bay, Gorgona Island, and Taboga Island. This has not been observed in the Hancock collections.

There are 17 recorded species, therefore, that are not included in the Hancock list. These with the 213 in the list make a total of 230 from this area.

A table (Table I), similar to that used in the first paper, will show the species distribution for all the Hancock material up to, and including, 1938. Table II gives the number of species in each family in each of the areas; Table III gives more detailed distribution of all of the species in the collection that have been recorded also in the Northeast Pacific; Table IV gives detailed distribution of all of the species found in the Atlantic as well, but not in the Northeast Pacific; Table V gives the detailed distribution of the species found in the vicinity of the Galapagos Islands.

TABLE I

<i>Species</i>	<i>Div. A</i>	<i>Div. B</i>	<i>Div. C</i>	<i>South of Div. B</i>	<i>North of Div. C</i>	<i>North Atlantic</i>
<i>Clava parva</i> .....			x			
<i>Corydendrium flabellatum</i> .....			x			
<i>Tubiclava laxa</i> .....			x			
<i>triserialis</i> .....	x					
<i>Turritopsis nutricula</i> .....	x	x	x		x	x
<i>Balea irregularis</i> .....	x					
<i>Coryne pusilla</i> .....			x			x
<i>repens</i> .....	x					
<i>Corynitis agassizii</i> .....	x		x			x
<i>Eugemmaria dendritica</i> .....			x			
<i>Gemmaria costata</i> .....	x					x
<i>gemmosa</i> .....	x	x				x
<i>Syncoryne flexibilis</i> .....		x	x			
<i>mirabilis</i> .....	x			x	x	x
<i>Bimeria gracilis</i> .....	x		x		x	
<i>laxa</i> .....	x					
<i>pygmaea</i> .....		x				
<i>tenella</i> .....	x		x		x	
<i>vestita</i> .....		x	x	x		x
<i>Bougainvillia crassa</i> .....		x	x			
<i>Perigonimus gracilis</i> .....		x				
<i>repens</i> .....	x	x	x	x	x	x
<i>robustus</i> .....			x			
<i>Eudendrium breve</i> .....	x					
<i>capillare</i> .....			x		x	x
<i>carneum</i> .....	x	x	x			x
<i>certicaule</i> .....	x					
<i>exiguum</i> .....		x				x
<i>nodosum</i> .....		x				
<i>ramosum</i> .....	x		x		x	x
<i>tenellum</i> .....	x	x	x		x	x
<i>tenue</i> .....	x	x	x			x
<i>Hydractinia carolinae</i> .....			x			x
<i>disjuncta</i> .....			x			
<i>epispongia</i> .....			x			
<i>hancocki</i> .....	x					
<i>longispina</i> .....	x	x				
<i>multispina</i> .....	x					
<i>polycarpa</i> .....		x				
<i>quadrigemina</i> .....			x			
<i>rugosa</i> .....		x				
<i>Podocoryne reticulata</i> .....		x				



<i>Species</i>	<i>Div. A</i>	<i>Div. B</i>	<i>Div. C</i>	<i>South of Div. B</i>	<i>North of Div. C</i>	<i>North Atlantic</i>
<i>Pennaria tiarella</i> .....	x	x	x		x	x
<i>Cladocoryne pelagica</i> .....	x	x				x
<i>Tubularia</i> sp.....		x				
<i>crocea</i> .....	x		x	x	x	x
<i>integra</i> .....	x		x			
<i>multitentaculata</i> .....			x			
<i>Bonneviella minor</i> .....	x					
<i>Campanularia emarginata</i> .....		x	x			
# <i>flexuosa</i> .....			x			x
<i>gracilicaulis</i> .....	x					
<i>hincksi</i> .....	x		x		x	x
<i>urceolata</i> .....			x		x	
<i>volubilis</i> .....	x		x		x	x
<i>Clytia acutidentata</i> .....	x		x			
<i>attenuata</i> .....	x				x	
<i>bakeri</i> .....			x		x	
<i>carinadentata</i> .....	x					
<i>coronata</i> .....			x			x
<i>cylindrica</i> .....	x	x	x		x	x
<i>edwardsi</i> .....	x		x		x	x
<i>fascicularis</i> .....		x	x			
<i>inconspicua</i> .....			x	x	x	x
<i>irregularis</i> .....			x			
<i>johnstoni</i> .....		x	x		x	x
<i>kincaidi</i> .....	x		x		x	x
<i>longicyatha</i> .....		x	x			x
<i>longithecæ</i> .....			x		x	
<i>macrocarpa</i> .....			x			
<i>multidentata</i> .....		x				
<i>raridentata</i> .....	x		x		x	x
<i>seriata</i> .....			x			
<i>universitatis</i> .....			x		x	
<i>Eucopella caliculata</i> .....		x		x	x	x
<i>everta</i> .....		x	x		x	
<i>minor</i> .....		x				
<i>Gonothyræa clarki</i> .....	x				x	x
<i>gracilis</i> .....	x	x	x	x	x	x
<i>serialis</i> .....		x	x			

# The detailed distribution of *Campanularia flexuosa* (Hincks) was inadvertently omitted on page 27 of the 1934 paper. It was obtained at Santa Maria Bay in 10 fathoms.

<i>Species</i>	<i>Div. A</i>	<i>Div. B</i>	<i>Div. C</i>	<i>South of Div. B</i>	<i>North of Div. C</i>	<i>North Atlantic</i>
<i>Obelia alternata</i> .....	x					
<i>articulata</i> .....	x					x
<i>commissuralis</i> .....			x		x	x
<i>dichotoma</i> .....	x	x	x		x	x
<i>equilateralis</i> .....		x				
<i>geniculata</i> .....	x	x	x	x	x	x
<i>hyalina</i> .....			x			x
<i>microtheca</i> .....		x				
<i>obtusidens</i> .....		x		x		
<i>plicata</i> .....	x	x	x		x	x
<i>tenuis</i> .....	x	x	x			
<i>Silicularia pedunculata</i> .....			x	x		
<i>Campanulina forskaea</i> .....			x		x	x
<i>ramosa</i> .....	x					
<i>Cuspidella humilis</i> .....		x	x		x	x
<i>Lovenella nodosa</i> .....		x	x			
<i>producta</i> .....		x	x		x	x
<i>rugosa</i> .....			x			
<i>Endothecium reduplicatum</i> .....			x			
<i>Halecium articulatum</i> .....			x		x	x
<i>beani</i> .....	x	x	x		x	x
<i>bermudense</i> .....	x					x
<i>corrugatum</i> .....		x			x	
<i>fasciculatum</i> .....	x					
<i>flabellatum</i> .....			x			
<i>gracile</i> .....			x			x
<i>halecinum</i> .....		x	x		x	x
<i>insolens</i> .....			x			
<i>nanum</i> .....			x			x
<i>parvulum</i> .....			x		x	
<i>regulare</i> .....			x			
<i>tenellum</i> .....	x		x	x	x	x
<i>tenuis</i> .....	x					
<i>tortum</i> .....		x	x			
<i>vagans</i> .....		x	x			
<i>washingtoni</i> .....	x	x	x		x	
<i>Ophiodissa alternata</i> .....			x			
<i>laxa</i> .....			x			
<i>negligens</i> .....		x				
<i>Hebella calcarata</i> .....			x			x
<i>Scandia corrugata</i> .....		x	x			
<i>expansa</i> .....		x				
<i>mutabilis</i> .....	x	x	x			x
<i>Acryptolaria pulchella</i> .....	x					
<i>Eucryptolaria pinnata</i> .....	x					



<i>Species</i>	<i>Div. A</i>	<i>Div. B</i>	<i>Div. C</i>	<i>South of Div. B</i>	<i>North of Div. C</i>	<i>North Atlantic</i>
<i>Filellum</i> <i>serpens</i> .....	x	x	x		x	x
<i>Lafoea</i> <i>dumosa</i> .....			x	x	x	x
<i>intermedia</i> .....	x		x			
<i>Lictorella</i> <i>adhaerens</i> .....	x					
<i>cervicornis</i> .....	x				x	
<i>Synthecium</i> <i>gracile</i> .....		x	x			x
<i>projectum</i> .....			x			
<i>rigidum</i> .....		x	x			
<i>symmetricum</i> .....		x	x			
<i>Abietinaria</i> <i>amphora</i> .....			x		x	
<i>anguina</i> .....			x		x	
<i>expansa</i> .....			x			
<i>Diphasia</i> <i>paarmani</i> .....	x					x
<i>Pasya</i> <i>quadridentata</i> .....	x	x	x			x
<i>Sertularella</i> <i>ampullacea</i> .....		x	x			
<i>clausa</i> .....			x			
<i>conica</i> .....	x	x	x	x	x	x
<i>erecta</i> .....	x					
<i>exilis</i> .....			x			
<i>formosa</i> .....		x	x			x
<i>fusiformis</i> .....	x				x	x
<i>incisa</i> .....			x			
<i>pedrensis</i> .....			x		x	
<i>rugosa</i> .....	x	x	x		x	x
<i>tenella</i> .....	x	x	x		x	x
<i>turgida</i> .....			x		x	
<i>Sertularia</i> <i>anceps</i> .....	x	x	x			
<i>cornicina</i> .....	x		x			x
<i>desmoides</i> .....	x		x		x	
<i>dispar</i> .....		x	x			
<i>exigua</i> .....			x			x
<i>furcata</i> .....		x	x		x	
<i>mayeri</i> .....		x	x			x
<i>operculata</i> .....		x		x		x
<i>stookeyi</i> .....	x	x	x			x
<i>versluysi</i> .....	x					x
<i>Thuiaria</i> <i>simplex</i> .....		x	x			
<i>tubuliformis</i> .....	x	x	x			x
<i>Aglaophenia</i> <i>diegensis</i> .....	x		x		x	
<i>dubia</i> .....	x					x
<i>inconspicua</i> .....	x		x		x	
<i>latirostris</i> .....			x		x	
<i>longicarpa</i> .....			x			
<i>lophocarpa</i> .....			x		x	x

<i>Species</i>	<i>Div. A</i>	<i>Div. B</i>	<i>Div. C</i>	<i>South of Div. B</i>	<i>North of Div. C</i>	<i>North Atlantic</i>
<i>Aglaophenia</i> octocarpa.....			x		x	
pinguis.....			x			
praecisa.....			x			
prominens.....		x	x			
propinqua.....			x			
rigida.....			x			x
struthionides.....			x		x	
symmetrica.....			x			
<i>Antennella</i> avalonia.....	x	x	x		x	
compacta.....			x			
gracilis.....	x		x			x
<i>Antennularia</i> alternata.....	x					
compacta.....			x			
irregularis.....		x	x			
reversa.....			x			
septata.....			x			
tetraseriata.....	x	x	x			
<i>Cladocarpus</i> tortus.....		x				
<i>Diplocheilus</i> allmani.....			x		x	
<i>Hippurella</i> longicarpa.....	x					x
<i>Lytocarpus</i> philippinus.....	x	x	x			x
<i>Monostaechas</i> quadridens.....	x	x	x			x
<i>Plumularia</i> acutifrons.....			x			
alicia.....			x		x	
alternata.....	x	x	x			x
attenuata.....			x			x
biarmata.....			x			
corrugata.....	x		x		x	x
defecta.....			x			
delicata.....	x					
filicula.....		x				x
floridana.....	x	x	x			x
inermis.....	x					x
lagenifera.....	x	x	x		x	x
magellanica.....	x	x		x		
margaretta.....		x				x
micronema.....			x			
propinqua.....			x			
septata.....		x				
setacea.....	x		x		x	x
sinuosa.....	x		x			
tenuissima.....	x		x			
<i>Schizotricha</i> tenella.....			x			x
<i>Streptocaulus</i> pulcherrimus....	x					x
213	92	83	152	15	66	85

TABLE II

<i>Families</i>	<i>Total</i>	<i>New</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>SofB</i>	<i>NofC</i>	<i>NA</i>
Clavidae.....	5	4	2	1	4		1	1
Tubidendridae.....	1	1	1					
Corynidae.....	8	3	5	2	4	1	1	5
Atractylidae.....	9	5	4	5	6	2	3	2
Eudendridae.....	9	3	6	5	5		3	6
Hydractinidae.....	10	9	3	4	4			1
Pennaridae.....	1		1	1	1		1	1
Cladocorynidae.....	1		1	1				1
Tubularidae.....	4	3	2	1	3	1	1	1
Bonneviellidae.....	1	1	1					
Campanularidae.....	43	15	18	18	31	6	21	20
Campanulinidae.....	6	3	1	3	5		3	3
Halecidae.....	21	9	6	7	16	1	7	7
Hebellidae.....	4	2	1	3	3			2
Lafoeidae.....	7	3	6	1	3	1	3	2
Synthecidae.....	4	3		3	4			1
Sertularidae.....	29	8	13	14	24	2	10	14
Plumularidae.....	50	22	21	14	39	1	12	18
	213	94	92	83	152	15	66	85

TABLE III

<i>Species</i>	<i>WLC</i>	<i>GofC</i>	<i>Mex</i>	<i>CA</i>	<i>Pan</i>	<i>SPan</i>	<i>Oc</i>	<i>NA</i>
<i>Turritopsis nutricula</i> .....			x	x				x
<i>Syncoryne mirabilis</i> .....							x	x
<i>Bimeria gracilis</i> .....		x	x	x	x		x	
<i>tenella</i> .....	x						x	
<i>Perigonimus repens</i> .....			x	x		x	x	x
<i>Eudendrium capillare</i> .....					x			x
<i>ramosum</i> .....	x	x	x		x		x	x
<i>tenellum</i> .....		x	x		x	x	x	x
<i>Pennaria tiarella</i> .....				x	x	x	x	x
<i>Tubularia crocea</i> .....					x		x	x
<i>Campanularia hincksi</i> .....	x	x	x				x	x
<i>urceolata</i> .....	x		x					
<i>volubilis</i> .....			x				x	x
<i>Clytia attenuata</i> .....							x	
<i>bakeri</i> .....			x					
<i>cylindrica</i> .....			x	x	x	x	x	x
<i>edwardsi</i> .....	x	x					x	x
<i>inconspicua</i> .....					x			x
<i>johnstoni</i> .....			x			x		x
<i>kincaidi</i> .....		x	x		x		x	x
<i>longitheca</i> .....			x					
<i>raridentata</i> .....			x				x	x
<i>universitatis</i> .....		x						
<i>Eucopella caliculata</i> .....						x		x
<i>everta</i> .....	x					x		
<i>Gonothyraea clarki</i> .....							x	x
<i>gracilis</i> .....		x	x	x		x	x	x
<i>Obelia commissuralis</i> .....			x	x	x			x
<i>dichotoma</i> .....			x			x	x	x
<i>geniculata</i> .....			x			x	x	x
<i>plicata</i> .....	x				x	x	x	x
<i>Campanulina forskalea</i> .....		x						x
<i>Cuspidella humilis</i> .....			x			x		x
<i>Lovenella producta</i> .....		x				x		x
<i>Halecium articulatum</i> .....	x							x
<i>beani</i> .....		x	x		x	x	x	x
<i>corrugatum</i> .....	x							
<i>halecinum</i> .....			x		x	x		x
<i>parvulum</i> .....	x							
<i>tenellum</i> .....		x	x		x		x	x
<i>washingtoni</i> .....	x			x		x	x	
<i>Filellum serpens</i> .....	x		x	x	x	x	x	x
<i>Lafoea dumosa</i> .....		x						x

<i>Species</i>	<i>WLC</i>	<i>GofC</i>	<i>Mex</i>	<i>CA</i>	<i>Pan</i>	<i>SPan</i>	<i>Oc</i>	<i>NA</i>
<i>Lictorella cervicornis</i> .....							x	
<i>Abietinaria amphora</i> .....	x							
<i>anguina</i> .....	x							
<i>Sertularella conica</i> .....	x		x			x	x	x
<i>fusiformis</i> .....							x	x
<i>pedrensis</i> .....	x	x						
<i>rugosa</i> .....	x					x	x	x
<i>tenella</i> .....					x	x	x	x
<i>turgida</i> .....	x							
<i>Sertularia desmoides</i> .....		x	x				x	
<i>furcata</i> .....	x					x		
<i>Aglaophenia diegensis</i> .....	x	x					x	
<i>inconspicua</i> .....	x						x	
<i>latirostris</i> .....	x							
<i>lophocarpa</i> .....		x						x
<i>octocarpa</i> .....	x	x						
<i>struthionides</i> .....	x							
<i>Antennella avalonia</i> .....			x			x	x	
<i>Diplocheilus allmani</i> .....	x							
<i>Plumularia alicia</i> .....	x							
<i>corrugata</i> .....	x	x					x	x
<i>lagenifera</i> .....	x	x	x			x	x	x
<i>setacea</i> .....	x	x					x	x
66	29	21	27	9	16	23	36	40

TABLE IV

<i>Species</i>	<i>WLC</i>	<i>GofC</i>	<i>Mex</i>	<i>CA</i>	<i>Pan</i>	<i>SPan</i>	<i>Oc</i>
<i>Coryne pusilla</i> .....	x						
<i>Corynitis agassizii</i> .....					x		x
<i>Gemmaria costata</i> .....							x
<i>gemmosa</i> .....						x	x
<i>Bimeria vestita</i> .....			x		x	x	
<i>Eudendrium carneum</i> .....			x			x	x
<i>exiguum</i> .....						x	
<i>tenue</i> .....		x	x		x	x	x
<i>Hydractinia carolinae</i> .....			x	x			
<i>Cladocoryne pelagica</i> .....						x	x
<i>Campanularia flexuosa</i> .....	x						
<i>Clytia coronata</i> .....			x		x		
<i>longicyatha</i> .....	x		x		x	x	
<i>Obelia articulata</i> .....							x
<i>hyalina</i> .....	x		x				
<i>Halecium bermudense</i> .....							x
<i>gracile</i> .....		x	x	x	x		
<i>nanum</i> .....		x		x	x		
<i>Hebella calcarata</i> .....		x	x		x		
<i>Scandia mutabilis</i> .....		x			x	x	x
<i>Synthecium gracile</i> .....	x		x		x	x	
<i>Diphasia paarmani</i> .....							x
<i>Pasya quadridentata</i> .....	x	x			x	x	x
<i>Sertularella formosa</i> .....			x		x	x	
<i>Sertularia cornicina</i> .....		x	x				x
<i>exigua</i> .....	x		x	x			
<i>mayeri</i> .....			x				x
<i>operculata</i> .....						x	
<i>stookeyi</i> .....			x		x	x	x
<i>versluysi</i> .....							x
<i>Thuiaria tubuliformis</i> .....			x		x	x	x
<i>Aglaophenia dubia</i> .....							x
<i>rigida</i> .....	x		x	x			
<i>Antennella gracilis</i> .....			x		x		x
<i>Hippurella longicarpa</i> .....							x
<i>Lytocarpus philippinus</i> .....		x	x	x	x	x	x
<i>Monostaechas quadridens</i> ...	x	x	x		x	x	x
<i>Plumularia alternata</i> .....			x		x	x	x
<i>attenuata</i> .....		x					
<i>filicula</i> .....						x	
<i>floridana</i> .....			x		x	x	x
<i>inermis</i> .....							x
<i>margaretta</i> .....						x	
<i>Schizotricha tenella</i> .....			x		x		
<i>Streptocaulus pulcherrimus</i> ..							x
45	9	10	23	6	20	20	25



TABLE V

<i>Species</i>	<i>Peru</i>	<i>Ec</i>	<i>Col</i>	<i>Pan</i>	<i>CA</i>	<i>Mex</i>	<i>GofC</i>	<i>WLC</i>	<i>NEP</i>	<i>NA</i>
<i>Turritopsis nutricula</i> .....		x			x	x			x	x
<i>Balea irregularis</i> .....										
<i>Coryne repens</i> .....										
<i>Corynitis agassizii</i> .....				x						x
<i>Gemmaria gemmosa</i> .....			x							x
<i>Syncoryne mirabilis</i> .....									x	x
<i>Bimeria gracilis</i> .....				x	x	x	x		x	
<i>laxa</i> .....										
<i>tenella</i> .....								x	x	
<i>Perigonimus repens</i> .....		x	x		x	x		x	x	x
<i>Eudendrium breve</i> .....										
<i>carneum</i> .....		x				x				x
<i>certicaule</i> .....										
<i>ramosum</i> .....				x		x	x	x	x	x
<i>tenellum</i> .....		x		x		x	x		x	x
<i>tenuis</i> .....			x			x	x			x
<i>Hydractinia hancocki</i> .....										
<i>longispina</i> .....	x									
<i>multispina</i> .....										
<i>Pennaria tiarella</i> .....		x		x	x					
<i>Tubularia crocea</i> .....				x					x	x
<i>integra</i> .....				x						
<i>Bonneviella minor</i> .....										
<i>Campanularia gracilicaulis</i> .....										
<i>hincksi</i> .....						x	x	x	x	x
<i>volubilis</i> .....						x			x	x
<i>Clytia acutidentata</i> .....						x	x			
<i>attenuata</i> .....									x	
<i>carinadentata</i> .....										
<i>cylindrica</i> .....	x	x		x	x	x		x	x	x
<i>edwardsi</i> .....							x	x	x	x
<i>kincaidi</i> .....						x	x		x	x
<i>Gonothyrea gracilis</i> .....	x	x	x		x	x	x		x	x
<i>Obelia alternata</i> .....										
<i>articulata</i> .....										x
<i>dichotoma</i> .....		x				x			x	x
<i>geniculata</i> .....	x					x			x	x
<i>plicata</i> .....		x	x	x			x	x	x	x
<i>tenuis</i> .....		x				x		x		
<i>Campanulina ramosa</i> .....										
<i>Halecium beani</i> .....		x		x		x	x		x	x
<i>bermudense</i> .....										x
<i>fasciculatum</i> .....										
<i>tenellum</i> .....				x		x	x		x	x
<i>tenuis</i> .....										
<i>washingtoni</i> .....	x				x			x	x	

<i>Species</i>	<i>Peru</i>	<i>Ec</i>	<i>Col</i>	<i>Pan</i>	<i>CA</i>	<i>Mex</i>	<i>GofC</i>	<i>WLC</i>	<i>NEP</i>	<i>NA</i>
<i>Scandia mutabilis</i> .....		x	x	x			x	x		x
<i>Acryptolaria pulchella</i> .....										
<i>Eucryptolaria pinnata</i> .....										
<i>Filellum serpens</i> .....		x	x	x	x	x	x		x	x
<i>Lafoea intermedia</i> .....						x				
<i>Lictorella adhaerens</i> .....										
<i>cervicornis</i> .....									x	
<i>Diphasia paarmani</i> .....										x
<i>Pasya quadridentata</i> .....		x		x				x		x
<i>Sertularia conica</i> .....	x					x		x	x	x
<i>erecta</i> .....										
<i>fusiformis</i> .....									x	x
<i>rugosa</i> .....	x							x	x	x
<i>tenella</i> .....	x	x	x	x					x	x
<i>Sertularia anceps</i> .....		x		x						
<i>cornicina</i> .....						x	x			x
<i>desmoides</i> .....						x	x		x	
<i>stookeyi</i> .....		x		x		x				x
<i>versluysi</i> .....										x
<i>Thuiaria tubuliformis</i> .....		x	x	x		x				x
<i>Aglaophenia diegenis</i> .....							x	x	x	
<i>dubia</i> .....										x
<i>inconspicua</i> .....		x							x	
<i>Antennella avalonia</i> .....			x	x		x			x	
<i>Hippurella longicarpa</i> .....										x
<i>Lytocarpus philippinus</i> .....		x	x	x	x	x	x			x
<i>Monostaechas quadridens</i> .....		x	x	x		x	x	x		x
<i>Plumularia alternata</i> .....		x	x	x	x	x				x
<i>corrugata</i> .....							x	x	x	x
<i>delicata</i> .....										
<i>floridana</i> .....		x		x		x				x
<i>inermis</i> .....										x
<i>lagenifera</i> .....	x					x	x	x	x	x
<i>magellanica</i> .....	x									
<i>setacea</i> .....							x	x	x	x
<i>sinuosa</i> .....						x				
<i>tenuissima</i> .....							x			
<i>Streptocaulus pulcherrimus</i> .....										x
84	10	23	13	23	10	32	23	17	34	46

## EXPLANATION OF HEADING ABBREVIATIONS

*Div. A*—Oceanic islands; *Div. B*—Mainland coast south of Balboa; *Div. C*—Mainland coast northwest of Balboa; *CA*—Central America, really confined to Costa Rica; *Col*—Colombia; *Ec*—Ecuador; *GofC*—Gulf of California; *Mex*—Mainland of Mexico; *NA*—North Atlantic; *NEP*—Northeast Pacific; *Oc*—Oceanic; *Pan*—Panama; *SPan*—South of Panama; *WLC*—West coast of Lower California.

Although the list of species in the region under consideration is very far from being complete, especially as most of the material was taken from the shallow water not very far from shore, it is quite possible that these species may be quite representative, because the stations for collecting were selected with considerable care, at not too distant intervals. The most noticeable gap is that between Costa Rica and Mexico on the Central American coast. Although this is so, the region is so large and the spots touched so almost insignificantly small that the distribution records are necessarily very much scattered; thus it is not possible to draw general conclusions as to distribution routes with any degree of satisfaction. The series of five distribution tables supports and emphasizes this statement, but still the tables are of interest because they show the trends in many of the species, genera, and even in some of the families. It is scarcely worth-while to remark on these trends in detail. A few instances will suffice to indicate their nature.

Of the 213 species listed in Table I, 94 species have been described as new, 119 were previously recorded. Much the greater number, 152, was obtained from Division C, 71% of the total number, with the other two divisions more nearly equal; Division A with 92, 43%, and Division B with 83, 39%. Of the total number 30 were found in each of the three divisions. Besides these, 23 were common to Divisions A and C, 27 to B and C, but only 4 to A and B. Since the number common to A and B, not found in C, is almost negligible, it is reasonable to suppose that Division A has received the 30 species common to the three divisions through Division C rather than through Division B.

Of the species listed, only 15 have been reported south of Peru, and all but three of these have also been reported from the Northeast Pacific, the North Atlantic, or both. It would seem that there is quite an effective barrier to hydroid distribution where the Humboldt Current leaves the South American coast to pass westward into the Pacific.

There is no indication of any similar barrier north of the equator. Of the 66 species in the list (55% of the 119 species previously reported) also recorded from the Northeast Pacific, 36 appeared in Division A and 61 in Divisions B and C. Of the latter, 12 were restricted to the west coast of Lower California, 10 others reached the Gulf of California, 7 to the mainland of Mexico, 1 to Costa Rica, 8 to Panama, and 23 were obtained farther south, in Division B. The detailed distribution is shown in Table III.

When the Caribbean Sea was wide open to the Pacific, before the Panama land connection appeared, the hydroid fauna of the West Indian region must have been much similar to that of the contiguous part of the Pacific since 85 species (out of 119, 71%) in this list have been reported in the North Atlantic, mostly from the West Indian region, or along the course of the Gulf Stream. These must all be old established species. The Northeast Pacific, with all the ages since the land connection was made, to the good, has much fewer species in common with the eastern tropical Pacific.

As 40 species are common to the Northeast Pacific and to the North Atlantic, there are still 45 species from the North Atlantic that have not yet been reported from the Northeast Pacific. Table IV gives the more detailed description of these 45 species. The proportions are much as one should expect from an examination of the other tables.

Table V shows detailed distribution of the hydroids obtained in the vicinity of the Galapagos Islands. Of the 84 species obtained, 17, mostly new, were not found in Division B or Division C, leaving 67 species that were recorded elsewhere, 32 in Division B and 49 in Division C. Of the 32 species in common with Division B, only two have not been reported from Division C, the Northeast Pacific or the North Atlantic. This bears out the previous statement that the additions to the Galapagos fauna, as far as hydroids are concerned, herein listed, reached that region through Division C and not to any extent through Division B. Of the 34 species reported also in the Northeast Pacific and 46 also in the North Atlantic, 25 species are common to both.

Only five species have been reported from the Pacific south of Peru, and only one of these has not been reported elsewhere. There is a closer relationship between the Galapagos region and Hawaii than between this region and Chili. In the not very extensive collection reported upon by Nutting from the Hawaiian Islands seven species were included that have now been obtained from the Galapagos Islands. Three of these, *Acryptolaria pulchella* (Allman), *Lictorella cervicornis* Nutting, and *Plumularia delicata* Nutting, may be considered to be definitely oceanic.

Table II shows the species distribution in the families (18) represented in the collection. In nearly all cases, these families were well distributed throughout the three divisions, and with the exception of two families, each represented by only one species, new species developed during this extension of distribution.





Conditions everywhere seem to have provided opportunities for variation in the Family Hydractinidae (mainly in the genus *Hydractinia*), where nine species out of ten in the family are described as new; and these new species are equally distributed among the three divisions. The Clavidae, the Tubularidae, and the Synthecidae, with smaller numbers of species, show much the same situation, except that the Synthecidae species were restricted to Divisions B and C.

The Lafoeidae is rather partial to the Galapagos region, particularly to the small area near North and South Seymour, Daphne Major and Minor islands, where conditions evidently favored variation in this family.

Of the larger families, the Plumularidae has the largest representation as well as the largest number of new species, relatively and absolutely. The most prolific small area, especially for the genera *Aglaophenia* and *Antennularia*, is the Gulf of California. Not very far behind is the Family Campanularidae, the only large family that has a greater number of species in common with the Northeast Pacific than with the North Atlantic. The Sertularidae and the Halecidae have not developed so many new species. The Sertularidae, which is so well represented in the Northeast Pacific, is saved from near elimination by the numerous species of *Sertularella* and *Sertularia*.

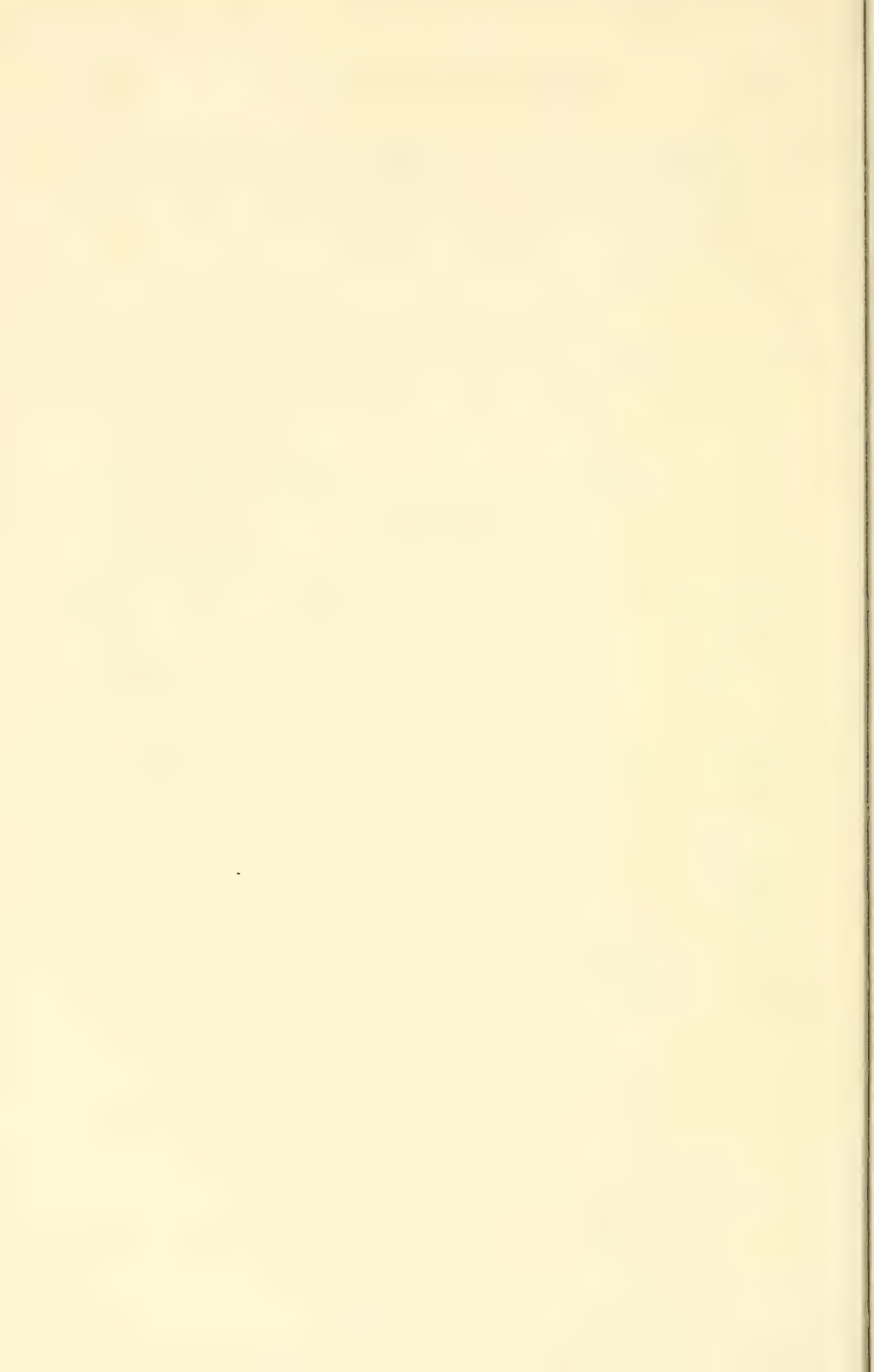
In the case of most of the species previously recorded, the records are sufficient to mark out quite well the distribution route, but there are some notable exceptions to this. For example, *Streptocaulus pulcherrimus* Allman was originally reported from Cape de Verde Islands, and not reported again until several specimens were obtained from the vicinity of Hood and Barrington islands in the Galapagos. *Endothecium reduplicatum* Fraser, reported previously only from Sagami Bay, Japan, when it was first described, was obtained from Bahia Honda and White Friars. These are not the only species, however, found in common with the Gulf Stream area or Equatorial Current, on the one hand, and in Japanese waters, on the other.

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## ERRATA

In Volume 4, Number 1: the explanation of Plate 6, Figure 25 should read: *Tubularia multitentaculata*.

In Volume 4, Number 2: Plate 16, Plate 17, and Plate 18 were omitted from the title.

In Volume 4, Number 3: Plate 19, Plate 20, and Plate 21 were omitted from the title.

REPORTS ON THE COLLECTIONS OBTAINED BY ALLAN HANCOCK PACIFIC EXPEDITIONS OF  
VELERO III OFF THE COAST OF MEXICO, CENTRAL AMERICA, SOUTH AMERICA, AND  
GALAPAGOS ISLANDS IN 1932, IN 1933, IN 1934, IN 1935, IN 1936, IN 1937, IN 1938, IN  
1939, IN 1940, AND IN 1941.

HYDROIDS OF THE ALLAN HANCOCK  
PACIFIC EXPEDITIONS SINCE MARCH, 1938  
(PLATES 22-48)

*By* C. McLEAN FRASER

THE UNIVERSITY OF SOUTHERN CALIFORNIA PUBLICATIONS

ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 4, NUMBER 5

ISSUED APRIL 21, 1948

PRICE \$2.50

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THE UNIVERSITY OF SOUTHERN CALIFORNIA PRESS

LOS ANGELES 7, CALIFORNIA

# HYDROIDS OF THE ALLAN HANCOCK PACIFIC EXPEDITIONS SINCE MARCH, 1938

C. McLEAN FRASER

## INTRODUCTION

In previous papers (numbers 1-4 in volume 4 of the Allan Hancock Publications), all of the hydroids obtained in the Allan Hancock Pacific Expeditions up to the end of March, 1938, that were readily available, were considered. After that date there was continued activity in collecting from the *Velero III* until the ship was taken over by the Navy in the autumn of 1941. These activities were confined largely to the waters of Southern California, the west coast of Lower California and the Gulf of California. There was one longer trip in 1939, when the *Velero III* was taken to Balboa, through the Panama Canal and eastward in the Caribbean Sea as far as Trinidad (The Caribbean hydroids have been written up in a separate paper). Since the *Velero III* was taken over, collecting has not been very extensive. There has been occasional local collecting, and in July and August, 1942, the Coos Bay region of the Oregon coast was investigated to some extent. This collecting, and particularly that carried out from the *Velero III* has been very fruitful. If the other marine animal groups are as well represented as the hydroids are, the collections will form the basis for research for many a day.

The hydroids, recognized as such, that were set aside at the time of collecting, made an extensive collection of themselves, but this has been greatly increased through the efforts of Dr. Irene McCulloch, and of others working under her direction. A search for additional hydroids was made throughout the general, marine collections, with notable success. Accordingly, when the whole of the Hancock collection of hydroids, not previously examined, was presented for examination, the amount of the material was somewhat staggering. However, in time it was all examined, and this paper has been prepared to report on the results.

In covering this hydroid material, 2,250 separate identifications were necessary. Eliminating the distribution duplicates, over 1,500 additional distribution records were provided, enough to change the whole face of distribution problems in the Eastern Pacific. The finding of new species is always of considerable interest, of course, but here the importance of such somewhat sinks into insignificance, when compared with the value

of the additional distribution data. So many species, described previously from only one location, and hence of which practically nothing could be learned as to their distribution, have appeared again in this collection, some of them many times, and in so many species, the known distribution range has been much extended, or gaps have been filled, so that the clarity of the distribution picture has been sensibly increased.

In spite of all these additional records, there are still 47 species with but one distribution record each. Hence although the distribution picture is much clearer than previously, much more collecting must be done before it is anywhere near being wholly satisfactory.

In this collection, 274 species were identified, as compared with 212 in previous Hancock collections; 142 species were common to both lots, little more than half the number in this recent collection. At present, therefore, 344 species of hydroids have been identified from the Hancock Pacific collections. Of the 37 species reported from the Hancock collection in the Caribbean Sea, 23 have appeared in the Eastern Pacific as well. The 14 not reported from the Eastern Pacific, added to the 344 species from the Eastern Pacific, give a total of 358 species thus far identified in the Hancock collections.

Now, 464 species of hydroids have been reported from the Eastern Pacific from Peru northward as compared with 435 from the northwest Atlantic. (To this number should be added another species, *Cordylophora lacustris* Allman, not before this reported from the Eastern Pacific area. Some excellent specimens were collected early in this year, 1946, by Dr. Robert C. Miller, California Academy of Sciences, in Lake Merced, Oakland, California. This increases the number to 465.)

The paper is prepared on the same general plan as paper No. 1, with the same treatment of synonymy, etc. In the matter of illustrations, natural size figures of new species have been included as they have been for all species in the Pacific and Atlantic hydroid papers, since systematists in general seem to find such illustrations useful in diagnosis. The enlarged drawings, unless otherwise indicated, have the same magnification, 20 diameters, so that they can readily be compared with previous illustrations. So little literature has been cited that is not included in earlier citations, especially in paper No. 1, that it is not worth while to include a complete bibliographic list for this paper.

As previously, I must pay tribute to the University of Southern California, to Captain Allan Hancock, as Captain of the *Velero III*, with the various scientists aboard, who have assisted in getting collections together, to all the officers and men of the ship's company at various

times, to Dr. Allan Hancock, as Director of the Allan Hancock Foundation, to Dr. Irene McCulloch, who has done so much to get the hydroid collection together, and to other members of the Foundation staff, who have contributed to the venture. I am under continued obligation to the University of British Columbia for providing accommodation and the necessary facilities for carrying on such research. Happily, this introduction provides a good opportunity to recognize and acknowledge all such obligations.

#### DISTRIBUTION

Of the 274 species in this latest collection, 50 are described as new, and in 4 other species, the gonosome has been described for the first time. Since the collection has covered little new ground, it seems to be more useful to make some general observations on the whole Eastern Pacific Hancock collection rather than to confine them to this recent collection.

To consider in detail the distribution data of each of the 274 species would be a big task in itself, and the results obtained would be quite outside the scope of this paper. In a paper on *Distribution and Relationship in American Hydroids*, just published by the University of Toronto Press, 29 families, 108 genera, and 685 species of American hydroids were written up comparatively as to distribution and relationship, and an attempt at correlation between these was made when such was possible. These 1,500 additional records change the situation very materially, especially in the region between Point Conception and Cape San Lucas. If these additional records are considered in detail, the results should be presented as an addendum to the distribution volume, but should be associated with the five papers on the Hancock hydroids of the Eastern Pacific and the single paper on the Caribbean hydroids.

In considering the distribution of all of the 344 species of Hancock hydroids from the Eastern Pacific, it seems advisable to present a distribution table in which, because of the great increase of distribution records, it is possible to divide the Eastern Pacific into smaller sections, 11 of them, to give a more detailed picture of the whole distribution. These sections are: the oceanic islands (OC), Peru, Ecuador (Ec), Colombia (Col), Panama (Pan), Central America (CA), Mexico (Mex), Gulf of California (G of C), west coast of Lower California (WLC), southern California, extending from the southern boundary to Point Conception (SC), and the remainder of the northeast Pacific (NEP). A twelfth column is added to show the species that are found as well in the northwestern Atlantic (NWA).



Table I Distribution

<i>Species</i>	<i>OC</i>	<i>Peru</i>	<i>Ec</i>	<i>Col</i>	<i>Pan</i>	<i>CA</i>	<i>Mex</i>	<i>G of C</i>	<i>WLC</i>	<i>SC</i>	<i>NEP</i>	<i>NWA</i>
<i>Clava parva</i> .....					x							
<i>Corydendrium flabellatum</i> .....					x		x					
<i>fruticosum</i> .....									x	x	x	
<i>Tubiclava laxa</i> .....							x			x		
<i>triserialis</i> .....	x						x					
<i>Turritopsis nutricula</i> .....	x		x		x	x	x				x	x
<i>Balea irregularis</i> .....	x											
<i>Coryne corrugata</i> .....										x		
<i>pusilla</i> .....									x			
<i>repens</i> .....	x											
<i>Corynitis agassizii</i> .....	x				x							x
<i>Eugemmaria dendritica</i> .....							x					
<i>Syncoryne flexibilis</i> .....				x	x		x					
<i>mirabilis</i> .....	x									x	x	x
<i>Zanclea costata</i> .....	x											x
<i>gemmosa</i> .....	x			x								x
<i>Bimeria franciscana</i> .....										x	x	
<i>gracilis</i> .....	x				x	x	x	x	x	x	x	x
<i>laxa</i> .....	x											
<i>pusilla</i> .....										x	x	
<i>pygmaea</i> .....			x									
<i>robusta</i> .....									x	x	x	
<i>tenella</i> .....	x							x	x	x	x	
<i>vestita</i> .....			x		x		x				x	
<i>Bougainvillia crassa</i> .....	x		x		x	x	x					
<i>glorietta</i> .....									x	x	x	
<i>Garveia annulata</i> .....										x	x	
<i>formosa</i> .....									x	x	x	
<i>groenlandica</i> .....										x	x	x
<i>Perigonimus gracilis</i> .....				x								
<i>repens</i> .....	x		x	x		x	x	x	x	x	x	x
<i>robustus</i> .....							x					x
<i>serpens</i> .....										x	x	
<i>Eudendrium album</i> .....									x			x
<i>attenuatum</i> .....								x	x	x		x
<i>breve</i> .....	x								x			
<i>californicum</i> .....										x	x	
<i>capillare</i> .....	x				x				x	x	x	x
<i>carneum</i> .....	x		x				x	x				x
<i>certicaule</i> .....	x								x			
<i>cochleatum</i> .....								x	x			x
<i>exiguum</i> .....				x	x							x

<i>Species</i>	<i>OC</i>	<i>Peru</i>	<i>Ec</i>	<i>Col</i>	<i>Pan</i>	<i>CA</i>	<i>Mex</i>	<i>G of C</i>	<i>WLC</i>	<i>SC</i>	<i>NEP</i>	<i>NW A</i>
eximium.....								x				x
nodosum.....			x									
rameum.....		x							x	x	x	x
ramosum.....	x	x			x		x	x	x	x	x	x
tenellum.....	x		x		x		x	x	x	x	x	x
tenue.....	x			x	x		x	x	x	x		x
<i>Hydractinia</i> armata.....										x	x	
carolinae.....						x	x					x
disjuncta.....					x	x						
epispongia.....							x					
hancocki.....	x											
longispina.....	x	x										
milleri.....										x	x	
multispina.....	x											
polycarpa.....			x							x		
prolifera.....					x							
quadrigemina.....							x					
rugosa.....				x								
<i>Podocoryne</i> reticulata.....			x									
<i>Pennaria</i> tiarella.....	x		x		x	x				x	x	x
<i>Cladocoryne</i> pelagica.....	x		x									x
<i>Ectopleura</i> media.....	x											
<i>Tubularia</i> crocea.....	x				x					x	x	x
<i>integra</i> .....	x				x							
<i>marina</i> .....										x	x	
<i>multitentaculata</i> .....									x			
<i>Bonneviella</i> minor.....	x											
<i>Campanularia</i> altithecata.....									x	x		
<i>castellata</i> .....								x		x	x	
<i>denticulata</i> .....							x	x		x	x	
<i>diversa</i> .....										x		
<i>emarginata</i> .....			x					x	x	x		
<i>exigua</i> .....										x	x	
<i>flexuosa</i> .....			x									x
<i>gracilicaulis</i> .....	x											
<i>hincksi</i> .....	x							x	x	x	x	x
<i>integra</i> .....										x	x	x
<i>obliqua</i> .....					x					x		
<i>ritteri</i> .....										x	x	
<i>urceolata</i> .....									x	x	x	x
<i>volubilis</i> .....	x						x			x	x	x
<i>Clytia</i> acutidentata.....	x						x	x				
<i>attenuata</i> .....	x										x	
<i>bakeri</i> .....							x			x	x	

[illegible]





<i>Species</i>	<i>OC</i>	<i>Peru</i>	<i>Ec</i>	<i>Col</i>	<i>Pan</i>	<i>CA</i>	<i>Mex</i>	<i>G of C</i>	<i>WLC</i>	<i>SC</i>	<i>NEP</i>	<i>NWA</i>
<i>mirabilis</i> .....											X	X
<i>trilateralis</i> .....									X	X	X	
<i>triserialis</i> .....									X	X	X	
<i>Sertularella amphorifera</i> .....	X								X	X		X
<i>ampullacea</i> .....				X	X			X				
<i>clausa</i> .....	X	X										
<i>conica</i> .....	X	X		X	X		X		X	X	X	X
<i>erecta</i> .....	X								X	X		
<i>exilis</i> .....				X			X	X				
<i>formosa</i> .....			X	X	X		X					X
<i>fusiformis</i> .....	X										X	X
<i>incisa</i> .....									X			
<i>multinoda</i> .....									X			
<i>pedrensis</i> .....						X		X	X	X	X	
<i>rugosa</i> .....	X	X						X	X	X	X	X
<i>similis</i> .....								X				
<i>sinuosa</i> .....									X	X		
<i>tenella</i> .....	X	X	X	X	X					X	X	X
<i>tricuspidata</i> .....									X	X	X	X
<i>turgida</i> .....									X	X	X	
<i>Sertularia anceps</i> .....	X		X		X		X		X			
<i>cornicina</i> .....	X						X	X	X	X		X
<i>dalmasi</i> .....									X			X
<i>desmoides</i> .....	X						X	X	X	X	X	
<i>dispar</i> .....			X						X			
<i>exigua</i> .....						X	X	X	X	X		X
<i>furcata</i> .....			X						X	X	X	
<i>inflata</i> .....	X		X									X
<i>mayeri</i> .....			X				X		X			X
<i>operculata</i> .....		X										
<i>pourtalesi</i> .....									X			X
<i>stabilis</i> .....								X				
<i>stookeyi</i> .....	X		X		X		X	X	X			X
<i>Thuiaria crisioides</i> .....	X		X	X	X	X	X					X
<i>fabricii</i> .....											X	X
<i>insociabilis</i> .....										X		
<i>similis</i> .....											X	X
<i>simplex</i> .....			X	X			X		X			
<i>Aglaophenia diegensis</i> .....	X							X	X	X	X	
<i>dispar</i> .....										X	X	
<i>diversidentata</i> .....										X		
<i>dubia</i> .....	X											X
<i>epizoica</i> .....									X	X		
<i>fluxa</i> .....										X		
<i>inconspicua</i> .....	X							X	X	X	X	
<i>integriseptata</i> .....									X	X		



<i>Species</i>	<i>OC</i>	<i>Peru</i>	<i>Ec</i>	<i>Col</i>	<i>Pan</i>	<i>CA</i>	<i>Mex</i>	<i>G of C</i>	<i>WLC</i>	<i>SC</i>	<i>NEP</i>	<i>NWA</i>
late-septata.....										X		
latirostris.....						X			X	X	X	
longicarpa.....							X	X				
lophocarpa.....								X	X	X	X	X
octocarpa.....									X	X		
pinguis.....							X	X	X	X		
pluma.....									X	X	X	
praecisa.....									X			
prominens.....		X							X	X		
propinqua.....								X				
rigida.....						X	X		X			X
struthionides.....									X	X	X	
symmetrica.....								X				
triplex.....								X				
venusta.....							X					
Antennella avalonia.....	X			X	X		X		X	X		
compacta.....									X			
gracilis.....	X				X		X					X
Antennularia alternata.....	X											
compacta.....								X	X			
constricta.....									X	X		
gracilis.....									X	X		
inconstans.....								X	X			
inverta.....										X		
irregularis.....			X	X				X		X		
mutabilis.....									X			
parva.....									X			
polynema.....								X	X	X		
reversa.....								X				
septata.....								X		X		
tetraseriata.....	X			X				X	X	X		
Cladocarpus gracilis.....										X		
moderatus.....	X									X		
pinguis.....									X	X		
tortus.....			X									
vancouverensis.....									X	X	X	
Diplocheilus allmani.....									X	X		
Hippurella longicarpa.....	X											X
Lytocarpus philippinus.....	X		X	X	X	X	X	X		X		X
Monostaechas quadridens.....	X		X	X	X		X	X	X	X		X
Plumularia acutifrons.....									X			
adjecta.....								X	X			
alicia.....							X		X	X	X	
altithecra.....				X								X

<i>Species</i>	<i>OG</i>	<i>Peru</i>	<i>Ec</i>	<i>Col</i>	<i>Pan</i>	<i>CA</i>	<i>Mex</i>	<i>G of C</i>	<i>WLC</i>	<i>SC</i>	<i>NEP</i>	<i>NWA</i>
<i>attenuata</i> .....								x		x		x
<i>biarmata</i> .....					x		x					
<i>corrugata</i> .....	x			x				x	x	x	x	x
<i>defecta</i> .....			x				x					
<i>delicata</i> .....	x											
<i>diaphana</i> .....	x		x	x	x		x					x
<i>exilis</i> .....								x	x	x		
<i>filicula</i> .....			x									x
<i>floridana</i> .....	x		x		x		x			x		x
<i>goodei</i> .....									x	x	x	
<i>inermis</i> .....	x								x			x
<i>insolens</i> .....									x	x		
<i>integra</i> .....										x		
<i>irregularis</i> .....										x		
<i>lagenifera</i> .....	x	x				x	x	x	x	x	x	
<i>magellanica</i> .....	x											
<i>margaretta</i> .....			x							x		x
<i>megalocephala</i> .....										x		x
<i>meganema</i> .....							x	x	x	x		
<i>micronema</i> .....	x				x	x						
<i>mobilis</i> .....									x	x		
<i>multiramosa</i> .....											x	
<i>mutabilis</i> .....								x				
<i>parva</i> .....	x									x		
<i>plumularoides</i> .....										x	x	
<i>propinqua</i> .....			x	x	x		x	x				
<i>reversa</i> .....								x	x	x		
<i>septata</i> .....		x										
<i>setacea</i> .....	x							x	x	x	x	x
<i>sinuosa</i> .....	x				x		x	x		x		
<i>tenuissima</i> .....	x							x	x			
<i>venusta</i> .....								x				
<i>Schizotricha tenella</i> .....					x		x			x		x
<i>Streptocaulus pulcherrimus</i> .....	x											
	107	22	57	41	69	27	93	91	139	186	128	120

The additional distribution records do much to confirm the general conclusions on distribution routes arrived at on the basis of the early, much more scanty, data and expressed in previous papers, hence it is scarcely necessary to cover the ground again here. It is more plainly evi-

dent that there is no effective barrier to distribution in the whole Eastern Pacific considered, and that during certain periods in the past, there was no such barrier between the Eastern Pacific and the Gulf of Mexico and the Caribbean Sea.

A crosscheck table, Table II, which gives the number of species restricted to each section, as well as the number in common with each section and each other section, demonstrates this definitely.

Table II

	<i>OC</i>	<i>Peru</i>	<i>Ec</i>	<i>Col</i>	<i>Pan</i>	<i>Ca</i>	<i>Mex</i>	<i>GofC</i>	<i>WLC</i>	<i>SC</i>	<i>NEP</i>	<i>NWA</i>
<i>OC</i>	17	12	25	20	33	13	39	40	43	47	40	56
<i>Peru</i>	12	3	6	5	5	5	7	4	11	14	12	10
<i>Ec</i>	25	6	4	19	25	10	33	18	21	23	14	30
<i>Col</i>	20	5	19	4	20	6	21	14	17	21	12	23
<i>Pan</i>	33	5	25	20	4	12	44	23	25	28	20	37
<i>CA</i>	13	5	10	6	12	0	15	13	15	14	12	14
<i>Mex</i>	39	7	33	21	44	15	6	32	43	44	29	45
<i>GofC</i>	40	4	18	14	23	13	32	9	52	53	25	37
<i>WLC</i>	43	11	21	17	25	15	43	52	10	98	66	51
<i>SC</i>	47	14	23	21	28	14	44	53	98	16	112	67
<i>NEP</i>	40	12	14	12	20	12	29	25	66	112	3	61
<i>NWA</i>	56	10	30	23	37	14	45	37	51	67	61	-

Of the 127 species from the Eastern Pacific north of Point Concepcion, 3 have not been obtained farther south, 4 have been obtained as well in the Atlantic but not farther south in the Pacific. The southern limit for the remaining 120 species is indicated in Table III, where the first line gives the number of species in each section where the species has not been reported from the oceanic area, and the second line when the species has been reported from the oceanic area as well.

Table III

	<i>SC</i>	<i>WLC</i>	<i>G of C</i>	<i>Mex</i>	<i>CA</i>	<i>Pan</i>	<i>Col</i>	<i>Ec</i>	<i>Peru</i>	<i>OC (Alone)</i>
1.	30	23	8	4	3	3	4	4	2	2
2.	3	1	6	4	-	6	2	7	10	-

Of the 129 Hancock species that have appeared in the northwest Atlantic as well, 61 have extended northward into NEP, 19 to SC, 12 to

WLC, 7 to G of C, 7 to Mex, 1 to CA, and 2 to Pan only. Of those which have extended southward, 10 reached Col, 30 to Ec, and 10 to Peru. Of those that appeared in the oceanic areas, there are no intermediate records for 5, 27 may have traveled either by way of the southern route or by the northern route, 21 by the northern route only, and 3 by the southern route only.

A table, Table IV, shows very well the value of the recent collection, since it gives the specific standing in each hydroid family in the Hancock collection as it was in March, 1938, when the previous papers were prepared, and as it is now. The third column gives the percentage in each case. It is largely in the area between Point Conception and Cape San Lucas, that the increase has taken place; 54 percent of the species in the Hancock collection as it is at present, has been obtained in the waters off Southern California, and 40 percent, off the west coast of Lower California.

Table IV

<i>Families</i>	<i>Previous</i>	<i>Present</i>	<i>% Increase</i>
Clavidae	5	6	20
Tubidendridae	1	1	-
Corynidae	8	9	12.5
Atractylidae	9	17	88.9
Eudendridae	9	15	66.7
Hydractinidae	10	13	30
Pennaridae	1	1	-
Cladocorynidae	1	1	-
Tubularidae	4	5	25
Bonneviellidae	1	1	-
Campanularidae	43	65	51.1
Campanulinidae	6	14	133.3
Halecidae	21	37	85.7
Hebellidae	4	4	-
Lafoeidae	7	14	100
Synthecidae	4	5	25
Sertularidae	29	50	72.4
Plumularidae	50	86	72
Total	213	344	61.5

## SYSTEMATIC DISCUSSION

Suborder **GYMNOBLASTEAE**Family **Clavidae**Genus **CORYDENDRIUM****Corydendrium** (?) **fruticosum** Fraser

*Corydendrium fruticosum* FRASER, Vancouver Island Hyd., 1914, p. 112.

FRASER, Hyd. Pacific Coast, 1937, p. 21.

*Distribution*.—10¾ miles west of Point Dume, Calif., 47-48 fathoms; 2½ miles SW of Seal Rocks, Santa Catalina Island, 87-90 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms.

Genus **TUBICLAVA****Tubiclava laxa** Fraser

*Tubiclava laxa* FRASER, Hancock Hyd. 1, 1938, p. 12.

*Distribution*.—Avalon Bay, Santa Catalina Island, 82-88 fathoms.

**Tubiclava triserialis** Fraser

*Tubiclava triserialis* FRASER, Hancock Hyd. 1, 1938, p. 12.

*Distribution*.—Chacahua Bay, Mexico, 10-15 fathoms.

Genus **TURRITOPSIS****Turritopsis nutricula** McCrady

*Oceania nutricula* MCCRADY, Proc. Elliott Soc., 1859, pp. 55-90.

*Turritopsis nutricula* MCCRADY, *ibid.*, p. 127.

FRASER, Hancock Hyd., 1, 1938, p. 12.

FRASER, *ibid.*, 3, 1938, p. 131.

*Distribution*.—San Lorenzo Channel, Gulf of California, 6-13 fathoms.

Family **Corynidae**Genus **CORYNE****Coryne** (?) **corrugata** Fraser

*Coryne corrugata* FRASER, Hyd. Pacific Coast, 1937, p. 27.

*Distribution*.—Willow Anchorage, Santa Cruz Island, Calif., low tide.

Genus **SYNCORYNE****Syncoryne mirabilis** (Agassiz)

*Coryne mirabilis* AGASSIZ, Contr. Nat. Hist. U. S., IV, 1862, p. 185.

*Syncoryne mirabilis* FRASER, Hancock Hyd., 1, 1938, p. 15.

*Distribution*.—East of Point Fermin, Calif., shore.

Family **Atractylidae**Genus **BIMERIA****Bimeria franciscana** Torrey

*Bimeria franciscana* TORREY, Hyd. Pacific Coast, 1902, p. 28.

FRASER, Hyd. Pacific Coast, 1937, p. 31.

*Distribution*.—Off San Nicolas Island, Calif., 30 fathoms; San Diego, shore.

**Bimeria gracilis** Clark

*Bimeria gracilis* CLARK, Hyd. Pacific Coast, 1876, p. 252.

FRASER, Hyd. Pacific Coast, 1937, p. 31.

FRASER, Hancock Hyd., 1, 1938, p. 16.

FRASER, *ibid.*, 2, 1938, p. 109.

FRASER, *ibid.*, 3, 1938, p. 131.

*Distribution*.—San Luis Obispo Bay, Calif., 8-14 fathoms; off Tyler Bight, San Miguel Island, shore; south of San Miguel Island, 5-15 fathoms;  $2\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 15-21 fathoms; off Gull Island, south of Santa Cruz Island, 43 fathoms;  $\frac{1}{2}$  mile north of Platt Point, Santa Cruz Island, 36-47 fathoms;  $3\frac{1}{4}$  miles SE of Cat Rock, Anacapa Island, 125-135 fathoms;  $3\frac{1}{2}$  miles south of Hueneme, 29-30 fathoms; off Redondo Canyon; 3 miles off Seal Cove, 11 fathoms; 6 miles SE of San Pedro breakwater, 20-25 fathoms; off Abalone Point, Laguna Beach, 54-57 fathoms; San Pedro Channel, 12 miles SE of Newport, 235-250 fathoms; off Newport Inlet, 6-8 fathoms; landing on Balboa Peninsula, off Newport Inlet, intertidal; Isthmus Cove, Santa Catalina Island, 80-100 fathoms; off San Nicolas Island, 28-30 fathoms; Dutch Harbor, San Nicolas Island, 15-22 fathoms; off La Jolla, 23 fathoms; San Diego, low tide;  $4\frac{3}{4}$  miles east of South Coronado Island, 14 fathoms; south of Tiburon Island, Gulf of California, 20 fathoms; Ensenada de San Francisco, Sonora, 15-22 fathoms; off Isabel Island, Mexico, 15-25 fathoms; Port Parker, Costa Rica, 3-8 and 5-10 fathoms.



**Bimeria (?) pusilla** Fraser

*Bimeria pusilla* FRASER, Some new and some previously unreported Hyd., 1925, p. 168.

FRASER, Hyd. Pacific Coast, 1937, p. 32.

*Distribution*.— $3\frac{1}{2}$  miles south of Hueneme, Calif., 29-30 fathoms;  $\frac{3}{4}$  mile SE of Cat Rock, Anacapa Island, 23-25 fathoms; Anaheim Landing, floating docks.

**Bimeria (?) robusta** Torrey

*Bimeria robusta* TORREY, Hyd. Pacific Coast, 1902, p. 29.

FRASER, Hyd. Pacific Coast, 1937, p. 32.

*Distribution*.— $2\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 15-21 fathoms; 3 miles off Seal Beach, Calif., 11 fathoms; off Huntington Beach, 4-20 fathoms; Dewey Channel, opposite Point Eugenio, Lower California, 21-24 fathoms.

**Bimeria (?) tenella** Fraser

*Bimeria tenella* FRASER, Some new and previously unreported Hyd., 1925, p. 168.

FRASER, Hyd. Pacific Coast, 1937, p. 33.

FRASER, Hancock Hyd., 1, 1938, p. 16.

FRASER, *ibid.*, 2, 1938, p. 109.

*Distribution*.—Hallmark Dock, Charleston, Ore., intertidal;  $8\frac{1}{2}$  miles south of Cedros Island, 64-65 fathoms; Dewey Channel, opposite Point San Eugenio, Lower Calif., 21-24 fathoms; Concepción Bay, Gulf of California, low tide; Ensenada de San Francisco, Sonora, 18 fathoms.

**Genus BOUGAINVILLIA****Bougainvillia crassa** Fraser

*Bougainvillia crassa* FRASER, Hancock Hyd., 1, 1938, p. 17.

FRASER, *ibid.*, 3, 1938, p. 131.

*Distribution*.—Off San Jose Point, Guatemala, 12-13 fathoms; Panama City, Panama, shore;  $9\frac{1}{2}$  miles SW of Zorritos Light, Peru, shore.

**Bougainvillia glorietta** Torrey

*Bougainvillia glorietta* TORREY, Hyd. San Diego, 1904, p. 7.

FRASER, Hyd. Pacific Coast, 1937, p. 37.

*Distribution*.—Off White Cove, Santa Catalina Island, 25-38 fathoms; Dewey Channel, opposite Point San Eugenio, Lower Calif., 21-24 fathoms.

Genus **GARVEIA****Garveia annulata** Nutting

*Garveia annulata* NUTTING, Hyd. Harriman Exped., 1901, p. 166.

FRASER, Hyd. Pacific Coast, 1937, p. 33.

*Distribution*.—Pacific Grove, Calif., Tyler Bight, San Miguel Island, shore;  $2\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 12-18 fathoms; east of Point Fermin, shore; 5 miles— $152^{\circ}$  from San Pedro breakwater, 19-21 fathoms; off Santa Catalina Island.

**Garveia formosa** (Fewkes)

*Perigonimus formosus* FEWKES, New Invert. Calif. Coast, 1889, p. 6.

*Garveia formosa* FRASER, Hyd. Pacific Coast, 1937, p. 35.

*Distribution*.— $6\frac{1}{2}$  miles ENE of Long Point, Santa Catalina Island, 300 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms.

**Garveia groenlandica** Levinsen

*Garveia groenlandica* LEVINSEN, Meduser, Ctenophorer, og Hydroider, etc., 1893, p. 155.

FRASER, Hyd. Pacific Coast, 1937, p. 35.

*Distribution*.—5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms.

Genus **PERIGONIMUS****Perigonimus repens** (Wright)

*Eudendrium repens* WRIGHT, Proc. Roy. Phys. Soc. Edin., 1858, p. 448.

*Perigonimus repens* FRASER, Hyd. Pacific Coast, 1937, p. 38.

FRASER, Hancock Hyd., 1, 1938, p. 17.

FRASER, *ibid.*, 3, 1938, p. 131.

*Distribution*.—Off Coos Bay, Ore., 35 fathoms; 2.6 miles east of East Point, Santa Rosa Island, 47-49 fathoms; off Huntington Beach, 4-20 fathoms; off Long Point, Santa Catalina Island, 101 fathoms;  $\frac{1}{2}$  mile east of Abalone Point, Laguna Beach, 44-46 fathoms; off San Nicolas Island, 28-31 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 45-55 fathoms; east of San Francisco Island, Gulf of California, 60 fathoms; north of White Friars Islands, Mexico, 15-20 fathoms; Chacahua Bay, 10-15 and 45-50 fathoms; off San Jose Point, Guatemala, 20 fathoms; SE of Daphne Major Island, Galapagos, 55 fathoms; Sullivan Bay, James Island, 35-40 fathoms.

**?Perigonimus robustus** Fraser

?*Perigonimus robustus* FRASER, Hancock Hyd., 1, 1938, p. 17.

FRASER, *ibid.*, 3, 1938, p. 137.

*Distribution*.—Chacahua Bay, Mexico, 10-15 fathoms.

**Perigonimus serpens** Allman

*Perigonimus serpens* ALLMAN, Ann. and Mag. Nat. Hist., (3), XI, 1863, p. 10.

FRASER, Hyd. Pacific Coast, 1937, p. 38.

*Distribution*.—5 miles—152° from San Pedro breakwater, 17-19 fathoms.

Family **Eudendridae**Genus **EUDENDRIUM****Eudendrium album** Nutting

*Eudendrium album* NUTTING, Ann. and Mag. Nat. Hist., (7), 1, 1898, p. 362.

FRASER, Atlantic Hyd., 1944, p. 61.

*Distribution*.—Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms.

**Eudendrium attenuatum** Norman

*Eudendrium attenuatum* NORMAN, Ann. and Mag. Nat. Hist., (3), 13, 1864, p. 83.

FRASER, Atlantic Hyd., 1944, p. 63.

*Distribution*.—5 miles SE of Santa Catalina Island, 140-150 fathoms; 1½ miles north of Cedros Island, 55-60 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; off Santa Maria Bay, 30-40 fathoms.

**Eudendrium breve** Fraser

*Eudendrium breve* FRASER, Hancock Hyd., 1, 1938, p. 18.

*Distribution*.—Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms; entrance to Tagus Cove, Albemarle Island, Galapagos, 50-60 fathoms.

**Eudendrium californicum** Torrey

*Eudendrium californicum* TORREY, Hyd. Pacific Coast, 1902, p. 32.

FRASER, Hyd. Pacific Coast, 1937, p. 39.

*Distribution*.—Pacific Grove, Calif.; north of Santa Barbara Island, 15-20 fathoms.

**Eudendrium capillare** Alder

*Eudendrium capillare* ALDER, Ann. and Mag. Nat. Hist., (2), 18, 1856, p. 355.

FRASER, Hyd. Pacific Coast, 1937, p. 40.

FRASER, Hancock Hyd., 1, 1938, p. 18.

*Distribution*.— $3\frac{1}{2}$  miles south of Hueneme, Calif., 29-30 fathoms;  $\frac{1}{2}$  mile south of west end of Anacapa Island, 26 fathoms; off San Nicolas Island, 28-31 fathoms; San Juanico Bay, Lower Calif., 24 fathoms; off Sulphur Bay, Clarion Island, 35 fathoms.

**Eudendrium carneum** Clarke

*Eudendrium carneum* CLARKE, Hyd. Chesapeake Bay, 1882, p. 137.

FRASER, Hancock Hyd., 1, 1938, p. 19.

*Distribution*.—Off Consag Rock, Gulf of California, 40-45 fathoms; north of Clarion Island, 30-50 fathoms.

**Eudendrium certicaule** Fraser

*Eudendrium certicaule* FRASER, Hancock Hyd., 1, 1938, p. 19.

*Distribution*.—8 miles west of Cedros Island, 64-65 fathoms.

**Eudendrium cochleatum** Allman

*Eudendrium cochleatum* ALLMAN, Hyd. Gulf Stream, 1877, p. 8.

FRASER, Atlantic Hyd., 1944, p. 66.

*Distribution*.—Off Rosario Bay, Lower Calif., 15 fathoms; San Jaime Bank, off Cape San Lucas, 120 fathoms; San Lorenzo Channel, Gulf of California, 3-5 fathoms; Salinas Bay, Carmen Island, 20 fathoms.

**Eudendrium exiguum** Allman

*Eudendrium exiguum* ALLMAN, Hyd. Gulf Stream, 1877, p. 6.

FRASER, Hancock Hyd., 1, 1938, p. 19.

*Distribution*.—Secas Islands, Panama, 12 fathoms.

**Eudendrium eximium** Allman

*Eudendrium eximium* ALLMAN, Hyd. Gulf Stream, 1877, p. 5.

FRASER, Atlantic Hyd., 1944, p. 68.

*Distribution*.—Off Rocky Point, Sonora, Mexico, 10 fathoms.

**Eudendrium rameum** (Pallas)

*Tubularia ramosa* PALLAS, Elench. Zooph. 1766, p. 83.

*Eudendrium rameum* FRASER, Hyd. Pacific Coast, 1937, p. 42.

*Distribution*.—Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms; off Lobos de Afuera Island, Peru, shore and 25-30 fathoms.

**Eudendrium ramosum** (Linn.)

*Tubularia ramosa* LINNAEUS, Syst. Nat., 1767, p. 1302.

*Eudendrium ramosum* FRASER, Hyd. Pacific Coast, 1937, p. 42.

FRASER, Hancock Hyd., 1, 1938, p. 20.

FRASER, *ibid.*, 2, 1938, p. 109.

*Distribution*.—Redondo Beach, Calif., shore; east of Point Fermin, shore; 6 miles SE of San Pedro breakwater, 20-21 fathoms; Tanner Bank, 45-46 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; off Rocky Point, Sonora, Mexico, 10 fathoms; off Bal-lenas Bay, Espiritu Santo Island, Gulf of California, 25 fathoms; off Lobos de Afuera Island, Peru, 25-30 fathoms.

**Eudendrium tenellum** Allman

*Eudendrium tenellum* ALLMAN, Hyd. Gulf Stream, 1877, p. 8.

FRASER, Hyd. Pacific Coast, 1937, p. 43.

FRASER, Hancock Hyd., 1, 1938, p. 20.

FRASER, *ibid.*, 2, 1938, p. 109.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution*.—3½ miles south of Hueneme, Calif., 29-30 fathoms; 1 mile SE of Smugglers Cove, Santa Cruz Island, 15-21 fathoms; east of Point Fermin, shore; off San Pedro, shore; 11 miles south of Seal Beach, 82-95 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms; San Jaime Bank, off Cape San Lucas, Lower Calif., 75 fathoms; San Gabriel Bay, Espiritu Santo Island, Gulf of California, 24 fathoms; south of San Esteban Island, 35 fathoms; off Cape San Francisco, Ecuador, 15 fathoms; at entrance to Tagus Cove, Albemarle Island, Galapagos, 50-60 fathoms.



**Eudendrium tenue** A. Agassiz

*Eudendrium tenue* A. AGASSIZ, N. A. Acalephae, 1865, p. 160.

FRASER, Hancock Hyd., 1, 1938, p. 20.

FRASER, *ibid.*, 2, 1938, p. 109.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution.*—1½ miles east of Cardwell Point, San Miguel Island, 20-21 fathoms; 2½ miles east of South Point, Santa Rosa Island, 23-28 fathoms; ½ mile south of Gull Island, south of Santa Cruz Island, 34-41 fathoms; off San Nicolas Island, 28-31 fathoms; east of Point Fermin, shore; 8½ miles south of Cedros Island, 60-65 fathoms; 4 miles north of Dewey Channel, Lower Calif., 64-65 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; north of Isla Partida, Gulf of California, 10 and 46-75 fathoms.

**Family Hydractinidae****Genus HYDRACTINIA****Hydractinia armata** Fraser

*Hydractinia armata* FRASER, Hyd. Calif. Coast, 1940, p. 39.

*Distribution.*—Dutch Harbor, San Nicolas Island, 15-22 fathoms; off San Nicolas Island, 30 fathoms.

**Hydractinia milleri** Torrey

*Hydractinia milleri* TORREY, Hyd. Pacific Coast, 1902, p. 34.

FRASER, Hyd. Pacific Coast, 1937, p. 47.

*Distribution.*—East of Point Fermin, shore; 5 miles—152° from San Pedro breakwater, 19-21 fathoms.

**Hydractinia multispina** Fraser

*Hydractinia multispina* FRASER, Hancock Hyd., 1, 1938, p. 23.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution.*—SE of Daphne Major Island, Galapagos, 55 fathoms.

**Hydractinia polycarpa** Fraser

*Hydractinia polycarpa* FRASER, Hancock Hyd., 1, 1938, p. 23.

*Distribution.*—North end of Ranger Bank, west of Cedros Island, 80-85 fathoms.



**Hydractinia prolifica**, new species

Plate 22, Fig. 1

*Trophosome*.—Colony covers closely a large gastropod shell. Nutritive zooids are placed close together around the margin, but they are pretty well crowded out of the portion of the shell farthest from the margin. The individual zooids have great power of extension even for *Hydractinia*, the longest observed being 4 mm. The tentacles are fewer than usual, 12-15.

*Spines*.—The spines are long, up to 0.75 mm, and very numerous; usually smooth, but sometimes rough or even spiny on the margin.

*Gonosome*.—(Only male colony observed.) The generative zooids are crowded on the more protected portion of the shell; they are small, about 1.0 mm in length, without tentacles. The gonophores are large for the size of the hydrocaulus, scattered but relatively close together, as many as 6 of them, on the one zooid.

*Other Zooids*.—No sensory or defensive zooids could be distinguished in the preserved specimens.

*Distribution*.—Station 944-39, 10 miles SW of Secas Islands, Panama, 30 fathoms.

*Remarks*.—This species resembles *H. echinata* (Fleming) more than any of the species so far reported from the Pacific coast, but the gonophores are more numerous, the spines longer, more slender, with less tendency to form secondary spines, and much more numerous. If the distribution range of *H. echinata* were more propitious it might seem possible that *H. prolifica* was derived from that species.

Family **Pennaridae**Genus **PENNARIA****Pennaria tiarella** (Ayres)

*Globiceps tiarella* AYRES, Proc. Boston Soc. Nat. Hist., 1854, p. 193.

*Pennaria tiarella* MCCRADY, Gymno. Charleston Har., 1859, p. 153.

FRASER, Hancock Hyd., 1, 1938, p. 25.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution*.—San Pedro, Calif.; San Francisco Bay, east of Panama City, shore; off La Libertad, Ecuador, 10 fathoms.

Family **Tubularidae**Genus **ECTOPLEURA****Ectopleura media**, new species

Plate 22, Fig. 2

*Trophosome*.—The solitary zooid grows to a height of 2 cm, but the pedicel is not particularly stout (0.75 mm in diameter); it is entirely free of annulations, but there is a constriction at the terminus. The proximal tentacles are long, about 30 in number; the distal tentacles relatively short, but they are more numerous, nearly 50.

*Gonosome*.—The peduncle that supports the medusa buds consists of a short main axis from which short, stout pedicels are given off, and these are terminated by medusa buds, which, when well developed, are nearly spherical.

*Distribution*.—Station 311-35, off Bindloe Island, Galapagos, in 20 fathoms.

*Remarks*.—This is the first species of *Ectopleura* that has appeared in the Eastern Pacific. It has much the same general appearance as other species of the genus, but in its special features it is quite different. In the relative length of the basal and oral tentacles, it more nearly resembles *E. grandis* Fraser, but in that species they are much fewer, with the same number in the two series, 14-16.

Genus **TUBULARIA****Tubularia crocea** (Agassiz)

*Parypha crocea* AGASSIZ, Contr. Nat. Hist. U. S., IV, 1862, p. 249.

*Tubularia crocea* FRASER, Hyd. Pacific Coast, 1937, p. 51.

FRASER, Hancock Hyd., 1, 1938, p. 26.

*Distribution*.—Off Fossil Point, Coos Bay, Ore., 4-6 fathoms; Redondo Beach, Calif., shore and on anchor chain; 3 miles SW of Fraser Point, Santa Cruz Island, 15-19 fathoms.

**Tubularia marina** Torrey

*Tubularia marina* TORREY, Hyd. Pacific Coast, 1902, p. 46.

FRASER, Hyd. Pacific Coast, 1937, p. 53.

*Distribution*.—Floating docks, Balboa, Calif.; San Diego, shore.

Suborder **CALYPTOBLASTEAE**Family **Campanularidae**Genus **CAMPANULARIA****Campanularia altitheca**, new species

Plate 23, Fig. 3

*Trophosome*.—Colony, 20 mm, consists of a fascicled, unbranched stem, and hydrothecae with long pedicels. There are not many tubes in the fascicle; each one, instead of ending abruptly, passes out to form the pedicel of a hydrotheca, the terminal one being much longer than the others, the free portion 3.5 mm in length; the pedicels of the others, although not so long, are still of considerable length, up to 2 mm. Each pedicel has 2-3 annulations at the base of the hydrotheca; those that terminate the tubes of the fascicle have no other annulations; those that do not have 1-3 annulations at the base. The hydrothecae are large, 1.0 x 0.5 mm, not far from being cylindrical except for the rounding of the base. The margin is provided with 10 emarginate, deeply-cut teeth.

*Gonosome*.—Gonangia grow from the tubes of the fascicled stem, much similar in shape and size to those of *C. flexuosa* Hincks (2.0 x 0.5 mm), nearly cylindrical, tapering to the base, and truncate distally, the walls slightly wavy, or sometimes definitely corrugated.

*Distribution*.—Station 1012-39, south of Pyramid Cove, San Clemente Island, Calif., 55-69 fathoms; gonosome, Station 618-37, San Jaime Bank, off Cape San Lucas, 75 fathoms; 2½ miles SE of Seal Rocks, Santa Catalina Island, 87-90 fathoms; 4 miles north of Todos Santos Island, Lower Calif., 40 fathoms.

**Campanularia (?) castellata** Fraser

*Campanularia castellata* FRASER, Some new and previously unreported Hyd., 1925, p. 170.

FRASER, Hyd. Pacific Coast, 1937, p. 59.

*Distribution*.—3 miles east of South Point, Santa Rosa Island, 17-18 fathoms; off San Nicolas Island, 28-31 fathoms; east of San Esteban Island, Gulf of California, 20-70 fathoms.

**Campanularia denticulata** Clark

*Campanularia denticulata* CLARK, Alaskan Hyd., 1876, p. 213.

FRASER, Hyd. Pacific Coast, 1937, p. 60.

*Distribution*.— $3\frac{1}{2}$  miles south of Hueneme, Calif., 29-30 fathoms; off Balboa Peninsula, Newport Inlet, intertidal;  $\frac{1}{2}$  mile off White Cove, Santa Catalina Island, 33-37 fathoms; off San Nicolas Island 28-31 fathoms; off Rocky Point, Sonora, Mexico, 10 fathoms; Tenacatita Bay, shore.

**Campanularia (?) diversa**, new species

Plate 23, Fig. 4

*Trophosome*.—Colonies, up to 3.5 cm, each consists of a main stem, stout, rigid, strongly but loosely fascicled, with the branches simple unless in the proximal portion, short, slender, irregularly arranged, in strong contrast, as far as appearance goes, to the stem; the primary branches may branch again. The branch is annulated with 5-6 annulations, immediately distal to the base of the branchlets, or the pedicels of the hydrothecae. The hydrotheca is supported on a short pedicel, annulated throughout or nearly so; the hydrotheca is large, among the largest in the Campanularidae, long, with gracefully curved sides, the diameter gradually and regularly increasing from base to margin,  $1.3 \times 0.5$  mm. The margin is provided with 11-12 teeth, deeply cut, with rounded sinuses, each tooth with 2 acute cusps, the sinus, relatively deep and rounded.

*Gonosome*.—Not observed.

*Distribution*.—All of the colonies examined were obtained from Station 1401-41,  $6\frac{1}{2}$  miles ENE of Long Point, Santa Catalina Island, in 300 fathoms, in each case closely associated with large colonies of *Acryptolaria conferta* Allman.

*Remarks*.—This species shows much greater resemblance to *C. gelatinosa* (Pallas) than to any other American species. The fascicled stem is similar, the branching is quite different as the complete branch corresponds very well with only the terminal portion of one of the much more numerous branches of *C. gelatinosa*. Since the branches are so few, so small, and so scattered, there is nothing here to give the gelatinous appearance of the colony of *C. gelatinosa*. The hydrotheca is similar in shape but not in size, as both length and diameter are almost twice as



great as they are in *C. gelatinosa*. The teeth on the margin are more deeply cut, as are also the acute cusps on each tooth. If the gonangia turn out to have as much similarity, there can be little doubt that *C. diversa* was derived directly from the species *C. gelatinosa*.

***Campanularia* (?) *emarginata* Fraser**

*Campanularia emarginata* FRASER, Hancock Hyd., 1, 1938, p. 27.

FRASER, *ibid.*, 2, 1938, p. 109.

*Distribution*.— $3\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 35-38 fathoms;  $3\frac{1}{2}$  miles south of Hueneme, Calif., 29-30 fathoms; north of Isla Partida, Gulf of California, 10 fathoms.

***Campanularia exigua* (Sars)**

*Laomedea exigua* SARS, Middelhavet's Littoral Fauna, 1857, p. 50.

*Campanularia exigua* FRASER, Hyd. Pacific Coast, 1937, p. 60.

*Distribution*.—Off San Pedro, Calif., exact location and depth not recorded.

***Campanularia hincksi* Alder**

*Campanularia hincksi* ALDER, Trans. Tynes F. C., 1857, p. 127.

*Campanularia hincksi* ALDER, Trans. Tynes F. C., 1857, p. 127.

FRASER, Hyd. Pacific Coast, 1937, p. 63.

FRASER, Hancock Hyd., 1, 1938, p. 28.

FRASER, *ibid.*, 2, 1938, p. 109.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution*.—Charleston, Ore., intertidal;  $3\frac{1}{2}$  miles south of Hueneme, Calif., 29-30 fathoms; off San Nicolas Island, 28-37 fathoms; 8 miles west of Cedros Island, 61-63 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; Puerto Refugio, Angel de la Guardia Island, Gulf of California, 78-90 fathoms.

***Campanularia integra* MacGillivray**

*Campanularia integra* MACGILLIVRAY, Ann. and Mag. Nat. Hist., (1)

IX, 1842, p. 465.

FRASER, Hyd. Pacific Coast, 1937, p. 64.

*Distribution*.—3 miles east of South Point, Santa Rosa Island, 23-26 fathoms; landing, Balboa Peninsula, Newport Inlet, intertidal; 5 miles— $152^{\circ}$  from San Pedro breakwater, 18-19 fathoms.

**Campanularia (?) obliqua** Clarke

*Campanularia obliqua* CLARKE, Albatross Hyd., 1907, p. 9.

FRASER, Hancock Hyd., 4, p. 155.

*Distribution*.—East of Point Fermin, Calif., shore.

**Campanularia ritteri** Nutting

*Campanularia ritteri* NUTTING, Harriman Hyd., 1901, p. 171.

FRASER, Hyd. Pacific Coast, 1937, p. 66.

*Distribution*.—Charleston, Ore., intertidal;  $2\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 15-21 fathoms; 1 mile east of Smugglers Cove, Santa Cruz Island, 19-20 fathoms; NE of Anacapa Island, 45 fathoms; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; 4 miles NE of buoy, Cortes Bank, 125-131 fathoms.

**Campanularia urceolata** Clark

*Campanularia urceolata* CLARK, Alaskan Hyd., 1876, p. 215.

FRASER, Hyd. Pacific Coast, 1937, p. 67.

FRASER, Hancock Hyd., 1, 1937, p. 28.

FRASER, *ibid.*, 2, 1938, p. 109.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution*.—Charleston, Ore., shore; near mouth of Salinas River, Monterey Bay, Calif., 10-13 fathoms; off Pacific Grove; off Point Arguello, 15-20 fathoms; Tyler Bay, San Miguel Island, shore; off Bechers Bay, Santa Rosa Island, 16 fathoms;  $2\frac{1}{2}$  miles east of South Point, 17-18 fathoms; 2.6 miles east of South Point, 17-20 and 23-26 fathoms; 6 miles east of South Point, 28-30 fathoms; 3 miles SW of Fraser Point, Santa Cruz Island, 15-19 fathoms; 1 mile east of Smugglers Cove, 19-20 fathoms; NE of Anacapa Island, 45 fathoms;  $\frac{3}{4}$  mile SE of Cat Rock, 23-25 fathoms; 4 miles east of landing, Santa Barbara Island, 40 fathoms; off Santa Monica; east of Point Fermin, shore; Anaheim Slough; 3 miles off Seal Beach, 11 fathoms;  $3\frac{1}{4}$  miles west of Huntington Beach, 17-18 fathoms; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; 7 miles east of Long Point, Santa Catalina Island, 228-267 fathoms; 1 mile NW of White Cove, 2-3 fathoms; 4 miles NE of buoy, Cortes Bank, 125-131 fathoms; Tanner Bank, 25-28 fathoms;  $7\frac{1}{2}$  miles south of Point Loma, 30-33 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 45-55 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms.



Genus **CLYTIA****Clytia acutidentata** Fraser

*Clytia acutidentata* FRASER, Hancock Hyd., 1, 1938, p. 28.

FRASER, *ibid.*, 2, 1938, p. 109.

*Distribution.*—North of White Friars Islands, Mexico, 15-20 fathoms.

**Clytia bakeri** Torrey

*Clytia bakeri* TORREY, Hyd. San Diego, 1904, p. 16.

FRASER, Hyd. Pacific Coast, 1937, p. 71.

FRASER, Hancock Hyd., 3, 1938, p. 132.

*Distribution.*—Long Beach, Calif.

**Clytia cylindrica** Agassiz

*Clytia cylindrica* AGASSIZ, Nat. Hist. U. S., IV, 1862, p. 306.

FRASER, Hyd. Pacific Coast, 1937, p. 71.

FRASER, Hancock Hyd., 1, 1938, p. 30.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution.*—Off Cape Arago Light, Coos Bay, Ore., intertidal; 1 mile east of Smugglers Cove, Santa Cruz Island, 17-20 fathoms; east of Point Fermin, Calif., shore; off San Nicolas Island, 28-31 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; off Cape San Francisco, Ecuador, 15 fathoms; off Manta Bay, 1 fathom; San Nicolas Bay, Peru, 10-25 fathoms; Tagus Cove, Albemarle Island, Galapagos, 12 fathoms.

**Clytia edwardsi** (Nutting)

*Campanularia edwardsi* NUTTING, Hyd. Woods Hole, 1901, p. 346.

*Clytia edwardsi* FRASER, Hyd. Pacific Coast, 1937, p. 72.

FRASER, Hancock Hyd., 1, 1938, p. 30.

FRASER, *ibid.*, 2, 1938, p. 109.

*Distribution.*—5 miles—152° from San Pedro breakwater, 17-19 fathoms; landing on Balboa Peninsula, Newport Inlet, intertidal; off San Nicolas Island, 28-31 fathoms; Rosario Bay, Lower Calif., 10-15 fathoms; Ensenada de San Francisco, Sonora, Mexico, 15-18 fathoms.

*Clytia exilis*, new species

Plate 24, Fig. 5

*Trophosome*.—Colony, 8 mm, lax, slender, and appearing more slender than it really is because of the large size of the hydrothecae and gonangia, growing from a filamentous stolon; although the colony may be quite erect, the stem does not pass up continuously in the same direction; the basal portion continues to form a long pedicel for a hydrotheca; where it passes into the pedicel, the next section of the stem is given off, which in turn gives rise to the pedicel of a hydrotheca, or of a gonangium; the next section of the stem arises from this, etc. The pedicel of the hydrotheca is long, 2 mm or more, but that of the gonangium is quite short. There are several annulations at each end of the long pedicel, usually more of them proximally than distally, several some distance from the proximal end of each stem section, and others along the entire length of the short pedicel of the gonangium. The hydrotheca is large, the largest in any American species of the genus,  $1.2 \times 0.43$  mm, gradually and regularly increasing in diameter from base to margin; there are 12 sharp, deeply cut teeth on the margin.

*Gonosome*.—The gonangium is large,  $1.4 \times 0.35$  mm, among the largest in American species of the genus; it is nearly cylindrical, but it tapers somewhat from the middle to the more slender base, and very slightly towards the distal end, although there is a slight expansion at the margin. The surface is smooth.

*Distribution*.—Station 1274-41,  $3\frac{1}{2}$  miles south of Hueneme, Calif., 29-30 fathoms.

*Remarks*.—The colony of *C. exilis* bears much resemblance to that of *C. macrocarpa* Fraser, obtained far away, off the coast of Peru. The arrangement of the stem and pedicels is quite similar, and the annulations appear in the same areas, but *C. macrocarpa* is a more delicate species; the hydrotheca is somewhat the same shape but is not nearly so large; the teeth are not so numerous, and not so deeply cut. The gonangium is similar in size, but the longitudinal, wavy lines, characteristic of *C. macrocarpa*, are not present in *C. exilis*. In this species, the resemblance to the gonangium in *C. cylindrica* is much more definite.

Unless or until further collection can close the geographical gap between the two species, *C. exilis* and *C. macrocarpa*, it would not be wise to consider very close relationship.

**Clytia fascicularis** Fraser

*Clytia fascicularis* FRASER, Hancock Hyd., 1, 1938, p. 30.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution*.—6¼ miles SE of South Point, Santa Rosa Island, 46 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; Playa Blanca, Costa Rica, 25 fathoms.

**Clytia hesperia** (Torrey)

*Campanularia hesperia* TORREY, Hyd. San Diego, 1904, p. 12.

*Clytia hesperia* FRASER, Hyd. Pacific Coast, 1937, p. 73.

*Distribution*.—5 miles—152° from San Pedro breakwater, 17-19 fathoms; Santa Maria Bay, Lower Calif., 5-25 fathoms; Tangola Tangola, Mexico, shore.

**Clytia inconspicua** (Forbes)

*Thaumantias inconspicua* FORBES, Br. Naked-eyed Medusae, 1848, p. 52.

*Clytia inconspicua* FRASER, Hyd. Pacific Coast, 1937, p. 74.

FRASER, Hancock Hyd., 1, 1938, p. 31.

*Distribution*.—Off Huntington Beach, Calif., 4-20 fathoms.

**Clytia irregularis** Fraser

*Clytia irregularis* FRASER, Hancock Hyd., 1, 1938, p. 31.

FRASER, *ibid.*, 2, 1938, p. 109.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution*.—North of Isla Partida, Gulf of California, 76 fathoms.

**Clytia johnstoni** (Alder)

*Campanularia johnstoni* ALDER, Ann. and Mag. Nat. Hist., (2), XVIII, 1856, p. 359.

*Clytia johnstoni* FRASER, Hyd. Pacific Coast, 1937, p. 74.

FRASER, Hancock Hyd., 1, 1938, p. 32.

*Distribution*.—3 miles east of South Point, Santa Rosa Island, 15-21 fathoms; off San Nicolas Island, 28-31 and 40-48 fathoms.

**Clytia kincaidi** (Nutting)

*Campanularia kincaidi* NUTTING, Hyd. Alaska and Puget Sound, 1899, p. 743.

*Clytia kincaidi* FRASER, Hyd. Pacific Coast, 1937, p. 75.

FRASER, Hancock Hyd., 1, 1938, p. 32.

FRASER, *ibid.*, 2, 1938, p. 109.

*Distribution.*—East of Point Fermin, Calif., shore; Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms.

**Clytia longicyatha** (Allman)

*Obelia longicyatha* ALLMAN, Hyd. Gulf Stream, 1877, p. 10.

*Clytia longicyatha* FRASER, Hancock Hyd., 1, 1938, p. 32.

*Distribution.*—3½ miles south of Hueneme, Calif., 29-30 fathoms; 1 mile SW of Ben Weston Point, Santa Catalina Island, 45-49 fathoms; South Bay, Cedros Island, 10-15 fathoms.

**Clytia longitheca** Fraser

*Clytia longitheca* FRASER, Hyd. Vancouver Island region, 1914, p. 137.

FRASER, Hyd. Pacific Coast, 1937, p. 75.

FRASER, Hancock Hyd., 1, 1938, p. 32.

*Distribution.*—3 miles east of South Point, Santa Rosa Island, 23-26 fathoms; 2½ miles east of South Point, 15-21 fathoms; 3½ miles south of Hueneme, Calif., 29-30 fathoms; east of Point Fermin, shore; 5 miles—152° from San Pedro breakwater, 17-19 fathoms; 8 miles west of Cedros Island, 61-63 fathoms.

**Clytia minuta** (Nutting)

*Campanularia minuta* NUTTING, Hyd. Woods Hole, 1901, p. 345.

*Clytia minuta* FRASER, Hyd. Pacific Coast, 1937, p. 76.

*Distribution.*—Off San Nicolas Island, 28-31 and 104 fathoms.

**Clytia noliformis** (McCrady)

*Campanularia noliformis* MCCRADY, Gymno. Charleston Har., 1859, p. 194.

*Clytia noliformis* FRASER, Atlantic Hyd., 1944, p. 144.

*Distribution.*—Off Solango Island, Ecuador, 3 fathoms.



***Clytia raridentata* (Alder)**

*Campanularia raridentata* ALDER, Ann. and Mag. Nat. Hist., (3), IX, 1862, p. 315.

FRASER, Hyd. Pacific Coast, 1937, p. 65.

*Clytia raridentata* FRASER, Hancock Hyd., 1, 1938, p. 33.

*Distribution*.—Off San Nicolas Island, 28-31 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms.

***Clytia* (?) *seriata* Fraser**

*Clytia seriata* FRASER, Hancock Hyd., 1, 1938, p. 33.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution*.—Tangola Tangola, Mexico, 15-20 fathoms; off the Central American coast.

***Clytia universitatis* Torrey**

*Clytia universitatis* TORREY, Hyd. San Diego, 1904, p. 19.

FRASER, Hyd. Pacific Coast, 1937, p. 76.

FRASER, Hancock Hyd., 2, 1938, p. 109.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution*.—3 miles east of South Point, Santa Rosa Island, 23-26 fathoms; Willow Anchorage, Santa Cruz Island, shore; off Santa Barbara, Calif., 33 fathoms; off Huntington Beach, 8-15 fathoms; 6 miles south of San Pedro breakwater, 20-21 fathoms; 2 miles west of Church Rock, Santa Catalina Island, 45-53 fathoms; 9½ miles NW of buoy, Cortes Bank, 90-100 fathoms; 7½ miles south of Point Loma, 10 and 30-33 fathoms; off San Diego; off Coronado Beach, 6-7 fathoms; 8 miles west of Cedros Island, 64-65 fathoms; 2 miles SE of Cedros Island Light, 42-55 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; off Santa Maria Bay, 18-25 fathoms; Salinas Bay, Carmen Island, Gulf of California, 20 fathoms; off Concepción Bay, 20 fathoms; north of Isla Partida, 76 fathoms; between Isla Partida and Angel de la Guardia Islands, 20 fathoms; Puerto Refugio, Angel de la Guardia Island, 11-22 fathoms; off Willard Point, Gonzaga Bay, 30-40 fathoms; off Consag Rock, 40-45 fathoms; off Rocky Point, Sonora, 10 and 11-13 fathoms; outside Guaymas, 6-10 fathoms; off Isabel Island, Mexico, 10-15 and 15-25 fathoms; off Port Parker, Costa Rica, 3-5 fathoms.

Genus **EUCOPELLA****Eucopella compressa** (Clark)

*Campanularia compressa* CLARK, Alaskan Hyd., 1876, p. 214.

*Eucopella compressa* FRASER, Hyd. Pacific Coast, 1937, p. 78.

*Distribution*.— $2\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 15-21 fathoms; 3 miles east of South Point, 23-26 fathoms; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; off San Nicolas Island, 30 fathoms.

**Eucopella everta** (Clark)

*Campanularia everta* CLARK, Hyd. of Pacific Coast, 1876, p. 253.

*Eucopella everta* FRASER, Hyd. Pacific Coast, 1937, p. 79.

FRASER, Hancock Hyd., 1, 1938, p. 34.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution*.—Pacific Grove, Calif.; Tyler Bight, San Miguel Island, shore; 1 mile south of East Point, Santa Rosa Island, 15-16 fathoms;  $2\frac{1}{2}$  miles east of South Point, 15-21 fathoms; east of Gull Island, south of Santa Cruz Island, 11-19 fathoms; 1 mile SE of Smugglers Cove, 15-21 fathoms; Willow Anchorage, low tide;  $\frac{3}{4}$  mile east of Cat Rock, Anacapa Island, 23-25 fathoms; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; 6 miles ESE of buoy, Cortes Bank, 56 fathoms; 3 miles west of Natividad Island, Lower Calif., 30-31 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; Lobos de Afuera Islands, Peru, 25-30 fathoms.

**Eucopella minor** Fraser

*Eucopella minor* FRASER, Hancock Hyd., 1, 1938, p. 34.

*Distribution*.—San Quentin Bay, Lower Calif., 3-5 fathoms.

Genus **GONOTHYRAEA****Gonothyraea clarki** (Marktanner-Turneretscher)

*Laomedea (Gonothyraea) clarki*, MARKTANNER, Hyd. from Ost-Spitzbergen, 1895, p. 408.

*Gonothyraea clarki* FRASER, Hyd. Pacific Coast, 1937, p. 80.

FRASER, Hancock Hyd., 1, 1938, p. 34.

*Distribution*.—5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms.



**Gonothyraea gracilis** (Sars)

*Laomedea gracilis* Sars, Beretning om en Zool. Reise, 1851, p. 18.

*Gonothyraea gracilis* FRASER, Hyd. Pacific Coast, 1937, p. 81.

FRASER, Hancock Hyd., 1, 1938, p. 35.

FRASER, *ibid.*, 2, 1938, p. 109.

FRASER, *ibid.*, 3, 1938, p. 132.

*Distribution.*—Off Bechers Bay, Santa Rosa Island, 16 fathoms; 2½ miles east of South Point, 15-21 fathoms; 3½ miles south of Hueneme, Calif., 29-30 fathoms; east of Point Fermin, shore; Newport Channel, shore; off San Nicolas Island, 28-31 fathoms; 3 miles west of Natividad Island, Lower Calif., 30-31 fathoms; Concepción Bay, Gulf of California; off White Rock, Isla Partida, 45 fathoms; Puerto Refugio, Angel de la Guardia Island, 78-90 fathoms; off Rocky Point, Sonora, 6-10 fathoms; Ensenada de San Francisco, 18 fathoms; outside Guaymas, 6-10 fathoms; Port Parker, Costa Rica, 3-8 and 5-10 fathoms; La Libertad, Ecuador, 10 fathoms; Tagus Cove, Albemarle Island, Galapagos, 12 fathoms.

**Gonothyraea inornata** Nutting

*Gonothyraea inornata* NUTTING, Hyd. Harriman Exped., 1901, p. 175.

FRASER, Hyd. Pacific Coast, 1937, p. 81.

*Distribution.*—Hallmark Dock, Charleston, Ore., intertidal.

**Gonothyraea serialis** Fraser

*Gonothyraea serialis* FRASER, Hancock Hyd., 1, 1938, p. 35.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution.*—West of Cape Rule, Socorro Island, 17-46 fathoms; Salinas Bay, Costa Rica, 2 fathoms; Octavia Rocks, Colombia, 45 fathoms; off La Libertad, Ecuador, 10 fathoms.

**Genus OBELIA****Obelia alternata** Fraser

*Obelia alternata* FRASER, Hancock Hyd., 1, 1938, p. 35.

*Distribution.*—Tagus Cove, Albemarle Island, Galapagos, 10-20 fathoms.

***Obelia biserialis*, new species**

Plate 24, Fig. 6

*Trophosome*.—Colony with a well marked, fascicled, main stem, with branches biserially arranged in the same plane, much like those in many of the species in the Sertularidae but unusual in the Campanularidae. These branches are given off in regular alternation; they are not fascicled and not branched again. Hydrothecae appear in the axils of the branches, and, arranged alternately, throughout the whole length of each branch. The hydrotheca increases in diameter gradually from base to margin, but the sides are straight and there is no flare at the margin. It is much the same size and shape as in *O. plicata* Hincks, but in this species some flaring takes place; the margin is entire and circular. In all of the hydrothecae except the terminal one on each branch, the pedicel is short, about the same length as the hydrotheca, and is annulated throughout, the annulations tending to be oblique. The longer pedicel of the terminal hydrotheca is annulated at both ends only.

*Gonosome*.—The gonangia are small, appearing in the axils of the more distant hydrothecae, little longer than the hydrothecae, and slender, less than 0.2 mm in greatest width. The distal end is rounded with the small aperture at the center.

*Distribution*.—Station 919-39, off Sulphur Bay, Clarion Island, 25-26 fathoms; north of Clarion Island, 25-26 fathoms; off Braithwaite Bay, Socorro Island, 17-46 fathoms.

***Obelia castellata* Clarke**

*Obelia castellata* CLARKE, Bull. Mus. Comp. Zool., Harvard, 1894, p. 73.

*Distribution*.—San Francisco Bay, east of Panama City, Panama, shore.

***Obelia commissuralis* McCrady**

*Obelia commissuralis* MCCRADY, Gymno. Charleston Har., 1859, p. 197.

FRASER, Hyd. Pacific Coast, 1937, p. 84.

FRASER, Hancock Hyd., 1, 1938, p. 36.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—East of Point Fermin, Calif., shore; 5 miles—152° from San Pedro breakwater, 17-19 fathoms; 1 mile east of Empire Landing, Santa Catalina Island, 18 fathoms; 3 miles west of Natividad Island, Lower Calif., 30-31 fathoms.

**Obelia corona** Torrey

*Obelia corona* TORREY, Hyd. San Diego, 1904, p. 14.

FRASER, Hyd. Pacific Coast, 1937, p. 84.

*Distribution*.—7½ miles south of Point Loma, Calif., 30-33 fathoms.

**Obelia dichotoma** (Linn.)

*Sertularia dichotoma* LINNAEUS, Syst. Nat., 1758, p. 812.

*Obelia dichotoma* FRASER, Hyd. Pacific Coast, 1937, p. 85.

FRASER, Hancock Hyd., 1, 1938, p. 36.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—1 mile south of Cardwell Point, San Miguel Island, 15-24 fathoms; Prisoners Harbor, Santa Cruz Island, on set line; east of Point Fermin, shore; Laguna Beach, shore; Chacahua Bay, lagoon; off Octavia Rocks, Colombia, 45 fathoms; off La Libertad, Ecuador, 10 fathoms.

**Obelia dubia** Nutting

*Obelia dubia* NUTTING, Hyd. Harriman Exped., 1901, p. 174.

FRASER, Hyd. Pacific Coast, 1937, p. 86.

*Distribution*.—Off Cape Arago Light, Coos County, Ore., intertidal; Bandon, Ore., on crab bait box; 5 miles—152° from San Pedro breakwater, 17-19 fathoms; east of Point Fermin, shore.

**Obelia equilateralis** Fraser

*Obelia equilateralis* FRASER, Hancock Hyd., 1, 1938, p. 36.

*Distribution*.—Off La Libertad, Ecuador, 10 fathoms.

**Obelia geniculata** (Linn.)

*Sertularia geniculata* LINNAEUS, Syst. Nat., 1767, p. 1312.

*Obelia geniculata* FRASER, Hyd. Pacific Coast, 1937, p. 87.

FRASER, Hancock Hyd., 1, 1938, p. 37.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—Off San Pedro, Calif.

***Obelia gracilis* Calkins**

*Obelia gracilis* CALKINS, Puget Sound Hyd., 1899, p. 353.

FRASER, Hyd. Pacific Coast, 1937, p. 87.

*Distribution*.—East of Gull Island, south of Santa Cruz Island, 6-10 fathoms; off San Pedro breakwater, 4 fathoms; 3 miles off Seal Beach, 11 fathoms; Newport Harbor, in channel, 4-10 fathoms; off San Nicolas Island, 28-31 fathoms; off Santa Maria Bay, Lower Calif., 18-25 fathoms.

***Obelia griffini* Calkins**

*Obelia griffini* CALKINS, Puget Sound Hyd., 1899, p. 357.

FRASER, Pacific Coast Hyd., 1937, p. 88.

*Distribution*.—South Bay, Cedros Island, 10-15 fathoms.

***Obelia hyalina* Clarke**

*Obelia hyalina* CLARKE, Blake Hyd., 1879, p. 241.

FRASER, Hancock Hyd., 1, 1938, p. 37.

FRASER, *ibid.*, 3, 1938, p. 133.

FRASER, Atlantic Hyd., 1944, p. 160.

*Distribution*.—Off Rocky Point, Sonora, Mexico, 10 fathoms; San Francisco Bay, east of Panama City, shore.

***Obelia longissima* (Pallas)**

*Sertularia longissima* PALLAS, Elench. Zooph., 1766, p. 119.

*Obelia longissima* FRASER, Hyd. Pacific Coast, 1937, p. 88.

*Distribution*.—Hallmark Dock, and other locations, Charleston, Ore., intertidal; Anaheim Landing, Calif., intertidal; 6 miles SE of San Pedro breakwater, 20-21 fathoms; off Isthmus Cove, Santa Catalina Island, 80-100 fathoms; off Goat Harbor, 21 fathoms; off Coronado Beach, 6-7 fathoms; off Octavia Rocks, Colombia, 45 fathoms.

***Obelia plicata* Hincks**

*Obelia plicata* HINCKS, Br. Hyd. Zooph., 1868, p. 154.

FRASER, Pacific Coast Hyd., 1937, p. 90.

FRASER, Hancock Hyd., 1, 1938, p. 38.

FRASER, *ibid.*, 2, 1938, p. 109.

*Distribution*.—Anaheim Landing, Calif., intertidal; 4 miles north of Todos Santos Island, Lower Calif., 41 fathoms; 3 miles north of Nativi-



dad Island, Lower Calif., 30-31 fathoms; south of Tiburon Island, Gulf of California, 20 fathoms; north of Clarion Island, 30-50 and 35-56 fathoms.

***Obelia surcularis* Calkins**

*Obelia surcularis* CALKINS, Puget Sound Hyd., 1899, p. 355.

FRASER, Pacific Coast Hyd., 1937, p. 90.

*Distribution*.—Off San Pedro, Calif.

Family **Campanulinidae**

Genus **CALYCELLA**

***Calycella syringa* (Linn.)**

*Sertularia syringa* LINNAEUS, Syst. Nat., 1767, p. 1311.

*Calycella syringa* FRASER, Hyd. Pacific Coast, 1937, p. 91.

*Distribution*.—Off Cape Arago Light, Ore., intertidal; San Luis Obispo Bay, Calif., 8-14 fathoms; 1 mile south of Cardwell Point, San Miguel Island, 34-35 fathoms;  $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 17-18 and 23-28 fathoms;  $2\frac{1}{2}$  miles east of South Point, 17-18 fathoms; 3 miles east of South Point, 23-26 fathoms; off Gull Island, south of Santa Cruz Island, 43 fathoms;  $3\frac{1}{2}$  miles south of Hueneme, 29-30 fathoms; 1 mile south of Santa Barbara Island, 20-40 fathoms; off Redondo Beach; 3 miles off Seal Beach, 11 fathoms; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; east of Long Point, Santa Catalina Island, 45-50 fathoms; 1 mile SW of Ben Weston Point, 45-49 fathoms; off San Nicolas Island, 28-31 fathoms; Tanner Bank, 37-40 fathoms; 15 miles south of La Jolla, 23 fathoms;  $2\frac{3}{4}$  miles off Point Loma, 9-13 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 45-55 fathoms.

Genus **CAMPANULINA**

***Campanulina* (?) *indivisa*, new species**

Plate 24, Fig. 7

*Trophosome*.—The small colonies, segregated quite closely, grow from a loosely reticulate stolon. The stem, 12 mm, is erect, unbranched or very slightly branched, very smooth, without annulations or nodes. The hydrothecae are given off with some approach to regularity in the proximal portion of the stem, alternate, but those on the two sides are seldom in the same plane. Distally, in some cases, the regularity ceases; the hydrothecae are much more closely placed, but the distance between any two in succession varies much. There are often more on one side than

on the other, and for some distance they may be all on the one side. The pedicels vary in length from 0.25 to 0.5 mm. There are 3-6 annulations near the base, and occasionally 2-3 distally. The hydrotheca is turbinate, with 12-14 segments, forming an operculum.

*Gonosome*.—Not observed.

*Distribution*.—Station 1424-41,  $6\frac{3}{4}$  miles east of Long Point, Santa Catalina Island, 267-347 fathoms.

*Remarks*.—This species is little like any other American species.

### **Campanulina rugosa** Nutting

*Campanulina rugosa* NUTTING, Hyd. Harriman Exped., 1901, p. 176.

FRASER, Pacific Coast Hyd., 1937, p. 93.

*Distribution*.—Hallmark Dock, Charleston, Ore., intertidal.

### Genus **CUSPIDELLA**

#### **Cuspidella grandis** Hincks

*Cuspidella grandis* HINCKS, Br. Hyd. Zooph., 1868, p. 210.

FRASER, Pacific Coast Hyd., 1937, p. 94.

*Distribution*.—Off San Nicolas Island, 31 fathoms.

#### **Cuspidella humilis** (Alder)

*Campanularia humilis* ALDER, Trans. Tynes. F. C., 1863, p. 239.

*Cuspidella humilis* FRASER, Pacific Coast Hyd., 1937, p. 94.

FRASER, Hancock Hyd., 1, 1938, p. 40.

*Distribution*.—Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms.

### Genus **EGMUNDELLA**

#### **Egmundella gracilis** Stechow

*Egmundella gracilis* STECHOW, Hyd. Deutschen Tiefsee Exped., 1921, p. 226.

FRASER, Pacific Coast Hyd., 1937, p. 95.

*Distribution*.—1 mile north of San Pedro Point, Santa Cruz Island, 45-46 fathoms; 1 mile east of White Cove, Santa Catalina Island, 21 fathoms; 2.8 miles WNW of Long Point, 64-68 fathoms; 5 miles SE of Church Rock, 117-118 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 20-25 fathoms; 8 miles west of Cedros Island, 64-65 fathoms; off Santa Maria Bay, Lower Calif., 18-25 fathoms.



**Egmundella polynema**, new species

Plate 25, Fig. 8

*Trophosome*.—Zooids commonly grow singly, but at times a pedicel grows out from the side of the original pedicel, not far below the base of the hydrotheca, curves immediately so that it continues in much the same direction as the original pedicel; the pedicel is not as long as the original, but it is long enough to overtop the original hydrotheca. The pedicels of the individuals differ much in length, the greatest height of a zooid observed being 3.6 mm. When the second zooid is present, the colony may reach the height of 4.5 mm. In nearly all cases, the pedicel is slightly annulated, but the position of the annulations varies greatly. The hydrotheca is of the regular, turbinate type, 1.0 x 0.25 mm; there are 12 segments in the operculum; the diaphragm is well marked. The unique feature of the species is the clustering of the nematophores, usually shortly below the hydrotheca, where there may be as many as a dozen or more, but more commonly fewer.

*Gonosome*.—The gonangium grows directly from the stolon; it is definitely cylindrical, about 1.8 mm in height, and 0.25 mm in diameter. It has an operculum divided like that of the hydrotheca, but the tip of the convergence is but little above the rim. Lines run down from each point of separation the full length of the gonangium. There is a constriction at the base to give the appearance of a pedicel. The gonangia were empty.

*Distribution*.—Station 1253-41, 8 miles west of Cedros Island, 64-65 fathoms.

*Remarks*.—The species is much larger than the only other species reported from the coast, *E. gracilis* Stechow. It is more nearly the size of *E. grandis* Fraser, found on the Atlantic coast, but it is not much like it in other respects. The segregation of the nematophores is the unique feature of the species.

Genus **LOVENELLA****Lovenella nodosa** Fraser

*Lovenella nodosa* FRASER, Hancock Hyd., 1, 1938, p. 40.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—Off Santa Maria Bay, Lower Calif., 18-25 fathoms; Tenacatita Bay, Mexico, 8-15 fathoms; north of White Friars Islands, 15-20 fathoms; Chacahua Bay, 5-10 and 10-15 fathoms; off San Jose Point, Guatemala, 20 fathoms; off Cape San Francisco, Ecuador, 15 fathoms.

**Lovenella producta** (Sars)

*Calycella producta* Sars, Norges Hydroider, 1873, p. 30.

*Lovenella producta* FRASER, Pacific Coast Hyd., 1937, p. 96.

FRASER, Hancock Hyd., 1, 1938, p. 40.

FRASER, *ibid.*, 2, 1938, p. 109.

*Distribution*.—3 miles NW of Anacapa Island Light, 15 fathoms.

**Lovenella rugosa** Fraser

*Lovenella rugosa* FRASER, Hancock Hyd., 3, 1938, p. 138.

*Distribution*.—Off Redondo Beach, Calif., 13-22 fathoms.

Genus **STEGOPOMA****Stegopoma fastigiata** (Alder)

*Calycella fastigiata* ALDER, Ann. and Mag. Nat. Hist., (3), III, 1860, p. 73.

*Stegopoma fastigiata* FRASER, Atlantic Hyd., 1944, p. 178.

*Distribution*.—South of San Miguel Island, 130-138 fathoms; 5 miles NE of Anacapa Island Light, 125-135 fathoms; 5 miles southeast of Santa Catalina Island, 140-150 fathoms; east of southwest end of Santa Catalina Island, 83-125 fathoms; 6½ miles ENE of Long Point, 300 fathoms; 6¼ miles NE by E of Long Point, 228 fathoms; 11½ miles SE of Church Rock, 21-40 fathoms.

Genus **THYROSCYPHUS****Thyroscyphus intermedius** Congdon

*Thyroscyphus intermedius* CONGDON, Bermuda Hyd., 1907, p. 482.

FRASER, Atlantic Hyd., 1944, p. 181.

*Distribution*.—1 mile WNW of Anacapa Island, 41-43 fathoms; off San Nicolas Island, 28-31 fathoms; off Lobos de Afuera Islands, Peru, 25-30 fathoms.

Family **Halecidae**Genus **CAMPALECIUM****Campalecium medusiferum** Torrey

*Campalecium medusiferum* TORREY, Hyd. Pacific Coast, 1902, p. 48.

FRASER, Hyd. Pacific Coast, 1937, p. 99.

*Distribution*.—Some specimens in a sample from 3 miles south of Fraser Point, Santa Cruz Island, 45-46 fathoms, appear to belong to this species, but since no gonosome was observed, the identification cannot be assured.

Genus **ENDOTHECIUM****Endothecium paucinodum** Fraser

*Endothecium paucinodum* FRASER, Caribbean Hyd., 1947, p. 8.

*Distribution.*—1 mile WNW of Anacapa Island, 41-43 fathoms; 6 miles SE of Santa Catalina Island, 150-155 fathoms.

*Note.*—In the description of this species given in the paper on Caribbean Hydroids, it is stated that the trophosome was described from the specimens obtained off Anacapa Island. The record off Santa Catalina Island appeared in a sample examined later.

As the Caribbean paper was prepared for publication before this one, to mention the species in it, it was necessary to include the description and the figures of the species, although under ordinary circumstances, the new species should be credited to the Eastern Pacific.

**Endothecium reduplicatum** Fraser

*Endothecium reduplicatum* FRASER, Some Japanese Hyd., 1935, p. 107.

FRASER, Hancock Hyd., 1, 1938, p. 41.

*Distribution.*—Off Tangola Tangola, Mexico, 15-20 fathoms.

Genus **HALECIUM****Halecium annulatum** Torrey

*Halecium annulatum* TORREY, Hyd. Pacific Coast, 1902, p. 49.

FRASER, Hyd., Pacific Coast, 1937, p. 101.

*Distribution.*— $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms;  $2\frac{1}{2}$  miles east of South Point, 17-18 fathoms; 1 mile east of Smugglers Cove, Santa Cruz Island, 19-20 fathoms; Redondo Beach Canyon; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; off Isthmus Cove, Santa Catalina Island, 80-100 fathoms; off Dutch Harbor, San Nicolas Island, 8-9 fathoms; off San Nicolas Island, 28-31 fathoms.

**Halecium articulatum** Clark

*Halecium articulatum* CLARK, New England Hyd., 1876, p. 63.

FRASER, Hyd. Pacific Coast, 1937, p. 101.

FRASER, Hancock Hyd., 1, 1938, p. 41.

*Distribution.*— $2\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 17-18 fathoms.

**Halecium beani** (Johnston)

*Thoa beani* JOHNSTON, Br. Zooph., 1838, p. 120.

*Halecium beani* FRASER, Hyd. Pacific Coast, 1937, p. 102.

FRASER, Hancock Hyd., 1, 1938, p. 41.

FRASER, *ibid.*, 2, 1938, p. 110.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—Bechers Bay, Santa Rosa Island, 13-16 fathoms;  $2\frac{1}{2}$  miles east of South Point, 15-21 fathoms; 3 miles east of South Point, 17-20 and 23-26 fathoms; south of Gull Island, south of Santa Cruz Island, 110-140 fathoms; east of Point Fermin, Calif., shore; 1 mile south of Ben Weston Point, Santa Catalina Island, 45-49 fathoms; Dutch Harbor, San Nicolas Island, 20-22 fathoms; Tanner Bank, 37-40 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; 3 miles NW of Natividad Island, 30-31 fathoms; San Juanico Bay, 24 fathoms; Santa Maria Bay, 18-25 fathoms; off White Rock, Isla Partida, Gulf of California, 45 fathoms; north of Isla Partida, 76 fathoms; at entrance to Tagus Cove, Albemarle Island, Galapagos, 50-60 fathoms.

**Halecium bermudense** Congdon

*Halecium bermudense* CONGDON, Bermuda Hyd., 1907, p. 472.

FRASER, Hancock Hyd., 1, 1938, p. 41.

FRASER, Atlantic Hyd., 1944, p. 1897.

*Distribution*.—South of Isla Partida, Gulf of California, 45 fathoms.

**Halecium corrugatum** Nutting

*Halecium corrugatum* NUTTING, Hyd. from Alaska and Puget Sound, 1899, p. 102.

FRASER, Hyd. Pacific Coast, 1937, p. 102.

FRASER, Hancock Hyd., 1, 1938, p. 41.

*Distribution*.—Off Cape Arago Light, Ore., intertidal;  $2\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms; 3 miles east of South Point, 17-20 fathoms; east of Point Fermin, Calif., shore; off San Nicolas Island, 28-31 fathoms; South Bay, Cedros Island, 10-15 fathoms; Concepción Bay, Gulf of California, 15 fathoms.



**Halecium densum** Calkins

*Halecium densum* CALKINS, Hyd. Puget Sound, 1899, p. 343.

FRASER, Hyd. Pacific Coast, 1937, p. 103.

*Distribution*.—Off Dutch Harbor, San Nicolas Island, 4-9 fathoms; off San Nicolas Island, 28-31 fathoms.

**Halecium exiguum**, new species

Plate 25, Fig. 9

*Trophosome*.—Colony, 15 mm, simple, slender, lax; stem sometimes erect with few irregularly placed branches, sometimes definitely flexed. Usually there is a distinct bend near each internode and the pedicel or branch is given off in such a way that it looks like dichotomy, but the stem has a node just above the forking. There may be an annulation about half way between the nodes. When a branch appears, it takes the place of a hydrophore; it resembles the main stem. The hydrophore is provided with a distinct pedicel; it is strongly flaring. Commonly a second hydrophore grows out of the first one and is similar to it; in some cases, the duplication may proceed even farther.

*Gonosome*.—Not observed.

*Distribution*.—Station 311-35, off Bindloe Island, Galapagos, 20 fathoms; off Lobos de Afuera Islands, Peru, 25-30 fathoms.

*Remarks*.—The species is not much like any of the other species in the Eastern Pacific. In the mode of growth it resembles *Ophiiodissa alternata* Fraser, more than it does any species of *Halecium*.

**Halecium fasciculatum** Fraser

*Halecium fasciculatum* FRASER, Hancock Hyd., 1, 1938, p. 42.

*Distribution*.—South of San Esteban Island, Gulf of California, 35 fathoms.

**Halecium flexile** Allman

*Halecium flexile* ALLMAN, Challenger Hyd., 2, 23, 1888, p. 11.

FRASER, Hyd. Pacific Coast, 1937, p. 104.

*Distribution*.—35 miles north of Depoe Bay, Ore., from a water-logged stump; 1½ miles south of Crook Point, San Miguel Island, 41-43 fathoms; 1½ miles east of Cardwell Point, 20-21 fathoms; 2¼ miles east of South Point, Santa Rosa Island; 23-28 fathoms; 1¾ miles west of Catalina Head, Santa Catalina Island, 50-51 fathoms; Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms; Boca de la Trinidad, Gulf of California, 53, 150 fathoms.

**Halecium flexum**, new species

Plate 25, Fig. 10

*Trophosome*.—Colony small, 1.0 cm, delicate, simple, with but few scattered branches of different lengths. The stem is divided into regular internodes by oblique nodes, each internode giving rise to a hydrophore, or a branch in place of it, near its distal end, the hydrophores regularly alternating. The hydrophore is attached to the stem by a short pedicel, which is turned out to such an extent that the margin of the hydrophore is at an angle of approximately  $45^{\circ}$  with the stem; the margin is definitely but not abruptly flaring. In many cases, duplication takes place; when it does, the pedicel of the secondary hydrophore, or at least the first of these, if there are more than one, has a conspicuous curve just where it leaves the previous hydrophore; it is as though all of the pedicel except the basal portion had been shoved upward, out of line with the base. This is the most characteristic feature of the trophosome.

*Gonosome*.—Not observed.

*Distribution*.—Station 14-33, off La Playa, Santa Elena Bay, Ecuador, 2-7 fathoms; off White Rock, Isla Partida, Gulf of California, 45 fathoms.

*Remarks*.—This species does not resemble any of the American species hitherto described very closely. The whole colony is somewhat like the simple portion of the stem of *H. muricatum* (E. and S.) but this species has not the characteristic curve of the secondary pedicel, although the whole pedicel is moved somewhat towards the upper margin of the hydrophore. *H. muricatum* is a heavy, coarse, fascicled species, and since it appears to be confined to the higher latitudes, the two species can scarcely have very close relationship.

**Halecium halecinum** (Linn.)

*Sertularia halecina* LINNAEUS, Syst. Nat., 1767, p. 308.

*Halecium halecinum* FRASER, Hyd. Pacific Coast, 1937, p. 104.

FRASER, Hancock Hyd., 1, 1938, p. 42.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—Off San Nicolas Island, 28-31 fathoms.

**Halecium insolens** Fraser

*Halecium insolens* FRASER, Hancock Hyd., 1, 1938, p. 43.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—Landing on Balboa Peninsula, Newport Channel, Calif., intertidal; north of Isla Partida, Gulf of California, 10 fathoms.



**Halecium kofoidi** Torrey

*Halecium kofoidi* TORREY, Hyd. Pacific Coast, 1902, p. 49.

FRASER, Hyd. Pacific Coast, 1937, p. 105.

*Distribution.*—5 miles—152° from San Pedro breakwater, 17-19 fathoms.

**Halecium labrosum** Alder

*Halecium labrosum* ALDER, Ann. and Mag. Nat. Hist., (3), III, 1859, p. 354.

FRASER, Hyd. Pacific Coast, 1937, p. 105.

*Distribution.*—5 miles—152° from San Pedro breakwater, 17-19 fathoms; 2 miles NW of buoy, Cortes Bank, 42-45 fathoms; Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms.

**Halecium macrocephalum** Allman

*Halecium macrocephalum* ALLMAN, Gulf Stream Hyd., 1877, p. 16.

FRASER, Atlantic Hyd., 1944, p. 196.

*Distribution.*—1½ miles north of Cedros Island, 45-55 fathoms.

**Halecium muricatum** (Ellis and Solander)

*Sertularia muricata* ELLIS and SOLANDER, Nat. Hist. Zooph., 1786, p. 59.

*Halecium muricatum* FRASER, Hyd. Pacific Coast, 1937, p. 106.

*Distribution.*—Ranger Bank, west of Cedros Island, 78-83 fathoms.

**Halecium parvulum** Bale

*Halecium parvulum* BALE, Proc. Linn. Soc. N. S. W., 1888, p. 760.

FRASER, Hyd. Pacific Coast, 1937, p. 107.

FRASER, Hancock Hyd., 2, 1938, p. 110.

*Distribution.*—5 miles—152° from San Pedro breakwater, 17-19 fathoms; off San Nicolas Island, 28-31 fathoms; South Bay, Cedros Island, 10-15 fathoms; off Thurloe Head, Lower Calif., 8-10 fathoms; south of San Esteban Island, Gulf of California, 35 fathoms.

**Halecium pygmaeum** Fraser

*Halecium pygmaeum* FRASER, West Coast Hyd., 1911, p. 48.

FRASER, Hyd. Pacific Coast, 1937, p. 107.

*Distribution.*—East of Point Fermin, Calif., shore.

**Halecium regulare** Fraser

Plate 25, Fig. 11

*Halecium regulare* FRASER, Hancock Hyd., 1, 1938, p. 43.FRASER, *ibid.*, 3, 1938, p. 133.

*Trophosome*.—Quite often a pedicellate hydrophore grows out of the sessile hydrophore and much more rarely this may be duplicated.

*Gonosome*.—(Not previously described.) The male gonangium usually grows out from the pedicel of the secondary hydrophore or less commonly directly from the stem, immediately below the sessile hydrophore. It is elongated, obovate, smooth, with scarcely any pedicel. The female gonangium has not yet been observed.

*Distribution*.—North of Isla Partida, Gulf of California, 10 fathoms.

**Halecium telescopicum** Allman*Halecium telescopicum* ALLMAN, Challenger Hyd., II, 1888, p. 10.

FRASER, Hyd. Pacific Coast, 1937, p. 110.

*Distribution*.—10¾ miles west of Point Dume, Calif., 47-48 fathoms.

**Halecium tenellum** Hincks*Halecium tenellum* HINCKS, Ann. and Mag. Nat. Hist., (3), VIII, 1861, p. 252.

FRASER, Hyd. Pacific Coast, 1937, p. 110.

FRASER, Hancock Hyd., 1, 1938, p. 44.

FRASER, *ibid.*, 2, 1938, p. 110.FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—Off San Pedro Nolasco Island, Gulf of California, 55-57 fathoms.

**Halecium tenue** Fraser*Halecium tenue* FRASER, Hancock Hyd., 3, 1938, p. 139.

*Distribution*.—North of Isla Partida, Gulf of California, 10 fathoms.

**Halecium vagans** Fraser*Halecium vagans* FRASER, Hancock Hyd., 1, 1938, p. 44.

*Distribution*.—2¼ miles east of South Point, Santa Rosa Island, 23-28 fathoms.

***Halecium washingtoni* Nutting**

*Halecium geniculatum* NUTTING, Hyd. Alaska and Puget Sound, 1899, p. 744.

*Halecium washingtoni* NUTTING, Amer. Nat., 1901, p. 780.

FRASER, Hyd. Pacific Coast, 1937, p. 111.

FRASER, Hancock Hyd., 1, 1938, p. 45.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution.*—Tyler Bight, San Miguel Island, shore; 3 miles east of South Point, Santa Rosa Island, 15-20 fathoms;  $3\frac{1}{2}$  miles east of South Point, 35-38 fathoms; 1 mile north of San Pedro Point, Santa Cruz Island, 45-46 fathoms;  $2\frac{1}{2}$  miles east of San Pedro Point, 26-40 fathoms;  $\frac{1}{2}$  mile east of San Pedro Point, 26-40 fathoms; 1 mile north of west end of Anacapa Island, 41-43 fathoms; east of Point Fermin, shore; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; Avalon, Santa Catalina Island, shore; off San Nicolas Island, 28-31 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; Port Parker, Costa Rica, shallow water on coral; off Nuez Island, Cocos Island, 31-50 fathoms.

***Halecium wilsoni* Calkins**

*Halecium wilsoni* CALKINS, Hyd. Puget Sound, 1899, p. 343.

FRASER, Hyd. Pacific Coast, 1937, p. 112.

*Distribution.*—Bechers Bay, Santa Rosa Island, 10 fathoms.

**Genus OPHIODISSA*****Ophiodissa alternata* Fraser**

*Ophiodissa alternata* FRASER, Hancock Hyd., 3, 1938, p. 139.

*Distribution.*— $1\frac{1}{2}$  miles north of Cedros Island, 55-60 fathoms; Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms; off Secas Islands, Panama, 12 fathoms.

***Ophiodissa corrugata* (Fraser)**

*Ophiodes corrugatum* FRASER, Hyd. Queen Charlotte Islands, 1936, p. 504.

*Ophiodissa corrugata* FRASER, Hyd. Pacific Coast, 1937, p. 113.

*Distribution.*—Tyler Bight, San Miguel Island, shore.

**Ophiodissa expansa**, new species

Plate 25, Fig. 12

*Trophosome*.—Colonies, growing in loose clusters, reach a height of 18 mm; the main stem, fascicled proximally, gives off a very few stout branches, each of which resembles the simple portion of the stem. The simple stem or branch is divided into internodes, varying somewhat in length, by slightly oblique nodes, not very distinct. The hydrophores are somewhat irregularly alternate, in some places almost subopposite, those on the two sides not quite in the same plane. In every case the pedicels are definite but vary much in length, sometimes corrugated slightly; the hydrophores expand to the margin so that the aperture may be twice the diameter of the supporting pedicel. The nematophores are large, tubular, sometimes curved slightly, placed either on the cauline internode or on the pedicel of the hydrophore.

*Gonosome*.—The gonangium, 1.32 x 0.5 mm, arises from the fascicled portion of the stem, projecting at right angles to it; it resembles some of the *Sertularella* gonangia, e.g., those of *S. tricuspidata* (Alder). It is elongated oval, with a short pedicel; very strongly crested rugosities appear throughout the whole length; the aperture is large, terminal.

*Distribution*.—Station 1232-41, 5 miles—152° from San Pedro breakwater, 17-19 fathoms; 2 miles NW of buoy, Cortes Bank, 42-45 fathoms.

**Ophiodissa laxa** Fraser

*Ophiodissa laxa* FRASER, Hancock Hyd., 1, 1938, p. 45.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—North of Clarion Island, 35-36 fathoms.

Family **Hebellidae**Genus **HEBELLA****Hebella calcarata** (A. Agassiz)

*Lafaea calcarata* A. AGASSIZ, N. A. Acalephae, 1865, p. 122.

*Hebella calcarata* FRASER, Hancock Hyd., 1, 1938, p. 46.

FRASER, *ibid.*, 2, 1938, p. 110.

*Distribution*.—Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms; north of Clarion Island, 35-36 fathoms; inside Georges Island, Gulf of California, 12-13 fathoms; south of Isla Partida, 20 fathoms; off White Rock, Isla Partida, 45 fathoms; south of White Friars Islands, Mexico, 25 fathoms.

Genus **SCANDIA****Scandia corrugata** Fraser

*Scandia corrugata* FRASER, Hancock Hyd., 1, 1938, p. 46.

FRASER, *ibid.*, 2, 1938, p. 110.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms.

**Scandia (?) expansa** Fraser

*Scandia expansa* FRASER, Hancock Hyd., 3, 1938, p. 140.

*Distribution*.—East of Point Fermin, Calif., shore; Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms; Puerto Refugio, Angel de la Guardia Island, Gulf of California, 78-90 fathoms; between Angel de la Guardia and Mejia Islands, 6-11 fathoms; Chacahua Bay, Mexico, 45-50 fathoms; entrance to Tagus Cove, Albemarle Island, Galapagos, 50-60 fathoms; between Wreck and Stephens Bays, Chatham Island, 35 fathoms.

**Scandia mutabilis** (Ritchie)

*Campanularia mutabilis* RITCHIE, Hyd. Cape de Verde Islands, 1907, p. 504.

*Scandia mutabilis* FRASER, Hancock Hyd., 1, 1938, p. 47.

FRASER, *ibid.*, 2, 1938, p. 110.

FRASER, *ibid.*, 3, 1938, p. 133.

*Distribution*.—3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms; east of San Francisco Island, Gulf of California, 47 fathoms; Magdalena Island, Tres Marias Islands, Mexico, 13 fathoms.

Family **Lafoeidae**Genus **ACRYPTOLARIA****Acryptolaria conferta** (Allman)

*Cryptolaria conferta* ALLMAN, Gulf Stream Hyd., 1877, p. 17.

*Acryptolaria conferta* FRASER, Hancock Hyd., 4, 1939, p. 155.

FRASER, Atlantic Hyd., 1944, p. 210.

*Distribution*.—San Pedro Channel, Calif., 68-82 fathoms;  $6\frac{1}{4}$  miles east of Long Point, Santa Catalina Island, 267-347 fathoms;  $6\frac{1}{2}$  miles east of Long Point, 300 fathoms;  $11\frac{1}{2}$  miles SE of Church Rock, 280 fathoms.



Genus **FILELLUM****Filellum serpens** (Hassall)

*Campanularia serpens* HASSALL, Trans. Micro. Soc., 1852, p. 163.

*Filellum serpens* FRASER, Hyd. Pacific Coast, 1937, p. 116.

FRASER, Hancock Hyd., 1, 1938, p. 47.

FRASER, *ibid.*, 2, 1938, p. 110.

FRASER, *ibid.*, 3, 1938, p. 134.

*Distribution.*— $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms;  $2\frac{1}{2}$  miles east of South Point, 17-18 fathoms; 3 miles east of South Point, 23-28 fathoms; 1 mile south of East Point, 15-16 fathoms; 3 miles SW of Fraser Point, Santa Cruz Island, 15-19 fathoms; 1 mile east of Smugglers Cove, 19-20 fathoms; 1 mile south of west end of Anacapa Island, 25-28 fathoms;  $10\frac{3}{4}$  miles west of Point Dume, Calif., 47-48 fathoms; north of Santa Barbara Island, 32-40 fathoms; 4 miles east of Landing, Santa Barbara Island, 40 fathoms; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms;  $3\frac{1}{2}$  miles— $238^{\circ}$  off Huntington Beach, 74-77 fathoms;  $\frac{1}{2}$  mile off White Cove, Santa Catalina Island, 33-37 fathoms; off White Cove, 40-80 fathoms;  $\frac{1}{2}$  mile north of Long Point, 21-40 fathoms; 5 miles SW of Church Rock, 117-118 fathoms;  $2\frac{1}{2}$  miles east of Church Rock, 59-61 fathoms; south of Pyramid Cove, San Clemente Island, 55-69 fathoms; off San Nicolas Island, 28-31 fathoms; Tanner Bank, 45-46 fathoms; 8 miles west of Cedros Island, 64-65 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; 3 miles NW of Natividad Island, 30-31 fathoms; San Jaime Bank, off Cape San Lucas, 75 fathoms; north of Isla Partida, Gulf of California, 10 and 46-75 fathoms; Puerto Refugio, Angel de la Guardia Island, 78-90 fathoms.

Genus **LAFOEA****Lafoea dumosa** (Fleming)

*Sertularia dumosa* FLEMING, Phil. Jour., II, 1828, p. 83.

*Lafoea dumosa* FRASER, Hyd. Pacific Coast, 1937, p. 119.

FRASER, Hancock Hyd., 2, 1938, p. 110.

*Distribution.*—Off San Pedro; off White Rock, Santa Catalina Island, 45 fathoms.



***Lafoea fruticosa* Sars**

*Lafoea fruticosa* SARS, Norske Hyd., 1863, p. 30.

FRASER, Hyd. Pacific Coast, 1937, p. 120.

*Distribution*.— $1\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 15-21 fathoms; 3 miles east of South Point, 23-26 fathoms; 13 miles SSE of East Point, 71-75 fathoms;  $10\frac{3}{4}$  miles west of Point Dume, Calif., 47-48 fathoms;  $7\frac{1}{4}$  miles SE of Seal Rocks, Santa Catalina Island, 152-200 fathoms;  $2\frac{1}{2}$  miles SE of Seal Rocks, 87-90 fathoms; 5 miles east of Church Rock, 117-118 fathoms; 4 miles SE of Church Rock, 109-116 fathoms; 7 miles WSW of Church Rock, 46-57 fathoms; south of Pyramid Cove, San Clemente Island, 55-69 fathoms; 9 miles off San Diego, 78-80 fathoms.

***Lafoea gracillima* (Alder)**

*Campanularia gracillima* ALDER, Trans. Tynes. F. C., 1857, p. 129.

*Lafoea gracillima* FRASER, Hyd. Pacific Coast, 1937, p. 121.

FRASER, Hancock Hyd., 4, 1939, p. 155.

*Distribution*.—Tyler Bight, San Miguel Island, shore;  $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms;  $2\frac{1}{2}$  miles east of South Point, 15-21 fathoms; off Willow Anchorage, Santa Cruz Island, 32-44 fathoms; north of Santa Barbara Island, 37-40 fathoms; east of Santa Barbara Island; off Redondo Beach; south of San Pedro breakwater, 24 fathoms; off Eagle Bank, north of Santa Catalina Island, 40-43 fathoms; off Howlands Landing, 130-160 fathoms; off Willow Cove; 37-44 fathoms; 1 mile east of Willow Cove, 83-125 fathoms; off Isthmus Cove, 80-100 fathoms;  $\frac{1}{2}$  mile north of Long Point, 21-40 fathoms; 7 miles east of Long Point, 230-240 fathoms; off Long Point, 40 fathoms;  $\frac{1}{2}$  mile off White Cove, 33-37 fathoms; Avalon Bay, 98-116 fathoms; off SE end of Santa Catalina Island, 83-125 and 117-128 fathoms;  $2\frac{1}{2}$  miles east of Seal Rocks, 152-200 fathoms; 4 miles east of Church Rock, 102-116 fathoms; 5 miles SE of Church Rock, 117-118 fathoms; 4 miles SE of Church Rock, 109-116 fathoms; 3 miles SE of Church Rock, 100-105 fathoms; off San Nicolas Island, 28-31 fathoms; 4 miles NE of buoy, Cortes Bank, 59-60 fathoms; Tanner Bank, 37-40 fathoms; Ranger Bank, west of Cedros Island, 78-83 fathoms;  $8\frac{1}{2}$  miles south of Cedros Island, 65 fathoms;  $7\frac{1}{2}$  miles SSW of Natividad Island, Lower Calif., 63-66 fathoms.

***Lafoea intermedia* Fraser**

*Lafoea intermedia* FRASER, Hancock Hyd., 1, 1938, p. 47.

FRASER, *ibid.*, 3, 1938, p. 134.

*Distribution*.—South of San Miguel Island, 130-138 fathoms;  $1\frac{1}{2}$  miles south of Crook Point, 41-43 fathoms; off Gull Island, south of Santa Cruz Island, 110-140 fathoms;  $\frac{1}{2}$  mile south of west end of Anacapa Island, 25-26 fathoms; 5 miles SE of Santa Catalina Island, 140-150 fathoms; off San Nicolas Island, 40-48 fathoms; Tanner Bank, 37-40 fathoms; 8 miles west of Cedros Island, 64-65 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms;  $7\frac{1}{2}$  miles SSW of Natividad Island, 63-66 fathoms; Outer Gorda Bank, Gulf of California, 59-95 fathoms; north of Isla Partida, 10 and 46-75 fathoms.

***Lafoea regia*, new species**

Plate 26, Fig. 13

*Trophosome*.—(Description from a fragment 4 cm in length.) Colony stout, rigid; main stem fascicled, but with fewer tubes than in the common species of this genus. In the specimen described as well as in a specimen from Station 1188-40, 6 miles SE of Santa Catalina Island, all of the branches are given off from the same side of the stem, nearly at right angles to the stem; they are fascicled nearly to the end, but the tubes are few. Each of the two largest branches has a secondary branch. The hydrothecae are similar in shape to those in *L. fruticosa* Sars, but are much larger, 1.8 x 0.4 mm, with one twist at the base; they are given off in regular alternation, fronto-laterally, from the theca-bearing tube, hence they are not nearly in the same plane. The margin flares slightly, and duplication may take place.

*Gonosome*.—Not observed.

*Distribution*.—Station 983-39,  $15\frac{1}{2}$  miles WNW of Santa Barbara Island, 70 fathoms; 6 miles SE of Santa Catalina Island, 150-155 fathoms;  $2\frac{1}{2}$  miles SE of Seal Rocks, 87-90 fathoms.

*Remarks*.—The queen of American species of *Lafoea* bears much resemblance to *L. fruticosa* Sars, and particularly to those specimens of that species in which the branches are all on the one side of the stem. The stem may be just as stout as the stem in that species, but there are not so many tubes in the fascicle. The hydrothecae are fronto-laterally, not directly laterally placed, and, of course, they are much larger; there is less twisting in the pedicels. Without any information as to the nature of

the coppinia, the relationship cannot be traced into the gonosome. If the resemblance exists here as well, it will be safe to conclude that *L. regia* has been developed directly from *L. fruticosa*, a species common in this general region.

***Lafoea tenellula* Allman**

*Lafoea tenellula* ALLMAN, Gulf Stream Hyd., 1877, p. 12.

FRASER, Atlantic Hyd., 1944, p. 227.

*Distribution*.— $6\frac{1}{2}$  miles ENE of Long Point, Santa Catalina Island, 300 fathoms.

**Genus LICTORELLA**

***Lictorella adhaerens* Fraser**

*Lictorella adhaerens* FRASER, Hancock Hyd., 1, 1938, p. 48.

*Distribution*.—1 mile WNW of Anacapa Island, 41-43 fathoms; NE of Anacapa Island, 50 fathoms; off San Nicolas Island, 40-48 fathoms; 11 miles NW of buoy, Cortes Bank, 45-46 fathoms; off San Benito Islands, Lower Calif., 51-52 fathoms; off San Pedro Nolasco Island, Gulf of California, 93-111 fathoms.

***Lictorella convallaria* (Allman)**

*Lafoea convallaria* ALLMAN, Gulf Stream Hyd., 1877, p. 12.

*Lictorella cervicornis* NUTTING, Hawaiian Hyd., 1905, p. 946.

FRASER, Hyd. Pacific Coast, 1937, p. 123.

FRASER, Hancock Hyd., 1, 1938, p. 48.

FRASER, *ibid.*, 3, 1938, p. 134.

*Lictorella convallaria* FRASER, Atlantic Hyd., 1944, p. 229.

*Distribution*.—13 miles SSE of East Point, Santa Rosa Island, 71-75 fathoms; 7 miles east of Long Point, Santa Catalina Island, on set line;  $6\frac{3}{4}$  miles east of Long Point, 267-347 fathoms;  $6\frac{1}{4}$  miles NE by E of Long Point, 228 fathoms;  $4\frac{1}{2}$  miles west of Church Rock, 50-51 fathoms; 8 miles west of Cedros Island, 64-65 fathoms; Ranger Bank, west of Cedros Island, 78-83 fathoms;  $5\frac{1}{2}$  miles south of San Benito Islands, 69-81 fathoms;  $8\frac{1}{2}$  miles south of San Benito Islands, 71-72 fathoms;  $7\frac{1}{2}$  miles WSW of Natividad Island, Lower Calif., 63-66 fathoms; San Jaime Bank, off Cape San Lucas, 75 and 120 fathoms; San Lorenzo Channel, Gulf of California, 3-5 fathoms; off White Rock, Isla Partida, 45 fathoms.

**Lictorella reflexa**, new species

Plate 26, Fig. 14

*Trophosome*.—The largest colony obtained was 4.5 cm; the main stem is stout, strongly fascicled, with some large branches given off at a wide angle; these are also fascicled, and even the secondary branches may be slightly so in the proximal portion. The simple branch is somewhat sinuous, with a well marked node near each bend. The hydrotheca is almost the reverse of that in *L. convallaria* in shape, that is to say, the curve is backward rather than forward, and it is similarly abrupt on the concave side. The pedicel is short, curved, with the convex side towards the base of the colony, i.e., the curve is opposite in type to that of the hydrotheca. The pedicel is not annulated but the hydrothecal septum is strongly marked. There is a long, slender nematophore on the basal portion of the pedicel; the nematophores on the fascicled portion of the stem or branch are larger than those on the simple stem or branch.

*Gonosome*.—The coppinia surrounds the main stem near its base; it is elliptical, 6 x 2 mm, the long axis in the direction of the stem. The gonangia are not very closely placed; each gonangium is broad at the base and tapers to the small opening; usually the narrower portion is slightly curved. The modified hydrothecae are not especially numerous; each is long and slender, usually forked at the extremity, but the two parts of the fork are not the same length. It looks somewhat like a phylactogonium of some of the species of *Cladocarpus*.

*Distribution*.—Station 1246-41, Ranger Bank, west of the northern part of Cedros Island, 78-83 fathoms; 13 miles SSE of East Point, Santa Rosa Island, 71-75 fathoms; 10¾ miles west of Point Dume, Calif., 47-48 fathoms; north of Santa Barbara Island, 37-40 fathoms; 6¼ miles SE of Long Point, Santa Catalina Island, 46 fathoms; 4 miles east of Church Rock, 106-110 fathoms; 1 mile south of Ben Weston Point, 45-49 fathoms; San Jaime Bank, off Cape San Lucas, 120 fathoms; north of Isla Partida, Gulf of California, 46-75 fathoms; off San Pedro Nolasco Island, 55-57 fathoms.

**Lictorella rigida**, new species

Plates 26, 27, Fig. 15

*Trophosome*.—Colony coarse, heavy, rigid, fascicled; in the smaller colonies there are no large branches similar to the main stem, but in the larger colonies, there may be two such large branches, up to 4 cm, one on each side of the stem, nearly opposite to each other. The stem and primary



branches give rise to smaller secondary branches, none more than 1 cm in length, sub-alternate or sub-opposite in position; these also are rigid and straight, and are fascicled to within a short distance of the distal end. All the parts of the colony are in the same plane. Hydrothecae are given off the stem, primary and secondary branches; they are arranged alternately, and on the terminal portion of the secondary branches, this alternation is quite regular. The hydrotheca has a short pedicel, and there is a slight twist where the hydrotheca leaves the pedicel. The hydrotheca is nearly tubular, and is curved much like that in *L. gracillima*, but the whole hydrotheca and pedicel are like those of *Zygophylax rigida* Fraser, but they are entirely free from the stem or branch. As in *Z. rigida*, there is a nematophore on the basal portion of the pedicel; it is like the numerous nematophores on the tubes of the fascicled stem, all of fair size, and tubular.

*Gonosome*.—The coppinia is large, encircling the main stem for a distance of 4 cm or more. The gonangia are large, flask-shaped, and closely crowded. There are no modified hydrothecae in the mass to serve for protection.

*Distribtuion*.—Station 1081-40, north of Isla Partida, Gulf of California, 46-76 fathoms; 1 mile south of Ben Weston Point, Santa Catalina, 45-49 fathoms.

*Remarks*.—This species is much coarser than any other species of *Lictorella* reported from the Eastern Pacific; in this respect it is more like *L. crassicaulis* Fraser, obtained in the West Indies, but the branching is not at all similar, nor is there much similarity in the other characters. As mentioned above, the hydrotheca and its accompanying nematophore are much similar to those of *Zygophylax rigida*. The nearest approach to these in the genus *Lictorella* appears in *L. reflexa* Fraser, although here the hydrotheca is smaller and the nematophore is larger. Among the species already reported, this species must be the closest relative; the two of them have been obtained in the same region.

### Family **Synthecidae**

#### Genus **SYNTHECIUM**

#### **Synthecium cylindricum** (Bale)

*Sertularella cylindrica* BALE, Proc. Linn. Soc. N. S. W., (2), 3, 1888, p. 765.

*Synthecium cylindricum* FRASER, Hyd. Pacific Coast, 1937, p. 124.



*Distribution*.— $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms;  $2\frac{1}{2}$  miles east of South Point, 12-18 fathoms; 3 miles east of South Point, 23-26 fathoms; 1 mile south of East Point, 15-16 fathoms; 3 miles SE of Fraser Point, Santa Cruz Island, 15-19 fathoms; 1 mile SE of Smugglers Cove, 15-21 fathoms; Willow Anchorage, low tide; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; 1 mile NW of White Cove, Santa Catalina Island, 2-3 fathoms; off San Nicolas Island, 28-31 fathoms; Tanner Bank, 37-40 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms;  $8\frac{1}{2}$  miles south of Dewey Channel, 49 fathoms; off Secas Islands, Panama, 12 fathoms.

***Synthecium projectum* Fraser**

*Synthecium projectum* FRASER, Hancock Hyd., 1, 1938, p. 49.

FRASER, *ibid.*, 3, 1938, p. 134.

*Distribution*.—South of White Friars Islands, Mexico, 25 fathoms.

***Synthecium symmetricum* Fraser**

*Synthecium symmetricum* FRASER, Hancock Hyd., 1, 1938, p. 50.

FRASER, *ibid.*, 3, 1938, p. 134.

*Distribution*.—Off San Pedro.

Family **Sertularidae**

Genus **ABIETINARIA**

***Abietinaria abietina* (Linn.)**

*Sertularia abietina* LINNAEUS, Syst. Nat., 1758, p. 808.

*Abietinaria abietina* FRASER, Hyd. Pacific Coast, 1937, p. 126.

*Distribution*.—San Luis Obispo Bay, Calif., 8-14 fathoms; Tanner Bank, 37-40 fathoms.

***Abietinaria amphora* Nutting**

*Abietinaria amphora* NUTTING, Amer. Hyd., II, 1904, p. 119.

FRASER, Hyd. Pacific Coast, 1937, p. 127.

FRASER, Hancock Hyd., 3, 1938, p. 134.

*Distribution*.— $1\frac{1}{2}$  miles east of Cardwell Point, San Miguel Island, 20-21 fathoms;  $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms;  $2\frac{1}{2}$  miles east of South Point, 17-18 fathoms; 1 mile south of East Point, 15-16 fathoms; 3 miles SW of Fraser Point, Santa Cruz Island, 15-19 fathoms; 1 mile SE of Smugglers Cove, 15-21 fathoms.

oms; Willow Anchorage, low tide; 0.3 miles NW of Pelican Bay, 35 fathoms;  $\frac{1}{2}$  mile north of Platt Harbor, 36-47 fathoms;  $\frac{1}{2}$  mile NE of Platt Harbor, 31-37 fathoms; 1 mile north of San Pedro Point, 26-40 fathoms;  $\frac{1}{2}$  mile south of Gull Island, 34-41 fathoms; east of Gull Island, 6-10 fathoms;  $\frac{1}{2}$  mile south of west end of Anacapa Island, 25-26 fathoms; 4 miles east of Landing, Santa Barbara Island, 40 fathoms;  $9\frac{1}{2}$  miles NW of buoy, Cortes Bank, 90-110 fathoms; Tanner Bank, 25-28 and 35-40 fathoms; 15 miles SE of La Jolla, 23 fathoms.

### ***Abietinaria anguina* (Trask)**

*Sertularia anguina* TRASK, Proc. Calif. Acad. Sc., 1857, p. 112.

*Abietinaria anguina* FRASER, Hyd. Pacific Coast, 1937, p. 128.

FRASER, Hancock Hyd., 2, 1938, p. 110.

*Distribution*.—Off Point Arguello, Calif., 15-30 fathoms;  $2\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 15-21 fathoms;  $\frac{3}{4}$  mile east of Cat Rock, Anacapa Island, 23-25 fathoms;  $1\frac{1}{2}$  miles SE of Point Mugu, Calif., 26-30 fathoms; off San Pedro;  $\frac{1}{4}$  mile east of Abalone Point, Laguna Beach, 44-46 fathoms;  $4\frac{1}{2}$  miles WNW of buoy, Cortes Bank, 90-100 fathoms; Tanner Bank, 37-40 fathoms; 4 miles north of Todos Santos Island, Lower Calif., 40 fathoms.

### ***Abietinaria expansa* Fraser**

*Abietinaria expansa* FRASER, Hancock Hyd., 2, 1938, p. 112.

*Distribution*.— $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms;  $2\frac{1}{2}$  miles east of South Point, 17-18 fathoms; 2.6 miles east of South Point, 35-38 fathoms; 3 miles east of South Point, 17-20 fathoms;  $6\frac{1}{4}$  miles SE of South Point, 46 fathoms; 1 mile south of East Point, 15-16 fathoms; 3 miles SW of Fraser Point, Santa Cruz Island, 15-19 fathoms;  $\frac{1}{2}$  mile south of Gull Island, 34-41 fathoms; 1 mile east of Smugglers Cove, 19-20 fathoms; 1 mile north of west end of Anacapa Island, 45-46 fathoms; Anacapa Passage, 15-50 fathoms; 1 mile south of west end of Anacapa Island, 125-135 fathoms;  $\frac{3}{4}$  mile east of Cat Rock, 23-25 fathoms;  $7\frac{1}{2}$  miles east of Long Point, Santa Catalina Island, 228-267 fathoms; 1 mile SW of Ben Weston Point, 45-49 fathoms; 1 mile NE of Castle Rock, San Clemente Island, 45-50 fathoms; west of Dutch Harbor, San Nicolas Island, 8-9 fathoms;  $4\frac{3}{4}$  miles SE of buoy, Cortes Bank, 125-131 fathoms;  $\frac{3}{4}$  mile off Point Loma, 9-13 fathoms; Rosario Bay, Lower Calif., 10-15 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 45-55 fathoms; off San Jose Point, Guatemala, 12-13 fathoms.

**Abietinaria greenei** (Murray)

*Sertularia greenei* MURRAY, Ann. and Mag. Nat. Hist., (3), V, 1860, p. 504.

*Abietinaria greenei* FRASER, Hyd. Pacific Coast, 1937, p. 132.

*Distribution*.—Off Point Arguello, Calif., 15-30 fathoms.

**Abietinaria pacifica** Stechow

Plate 27, Fig. 16

*Abietinaria pacifica* STECHOW, Hyd. Fauna des Mittelsmeeres, etc., 1923, p. 197.

FRASER, Hyd. Pacific Coast, 1937, p. 134.

*Trophosome*.—In 1923, Stechow described the species *A. pacifica* from a fragment 6 mm long, on the back of a crab. It has not been reported since until now that several fine colonies have appeared in the Hancock collections obtained in the region extending from the northern Channel Islands, Calif., to Cedros Island, Lower Calif. Many of these are larger, up to 9.5 cm, with numerous branches arranged regularly, as they are in the smaller specimens. Some of the branches are longer than the 7 mm which Stechow mentions; the longest 12 mm.

*Gonosome*.—(Not previously described.) The gonangia are similar to those of *A. traski*, but instead of being crowded on the face of the branches, they are scattered, with but few on a branch. They are similarly obovate, without a collar, and with a smooth surface.

*Distribution*.—1 mile NE of San Miguel Island, 35-39 fathoms;  $\frac{1}{2}$  mile south of Crook Point, 41-43 fathoms;  $6\frac{1}{2}$  miles SE of South Point, Santa Rosa Island, 46 fathoms;  $3\frac{1}{2}$  miles east of South Point, 35-38 fathoms; Santa Cruz Channel, 32-34 fathoms; Prisoners Harbor, Santa Cruz Island, 35-45 fathoms; 1 mile north of San Pedro Point, 45-46 fathoms; 3 miles NW of Anacapa Island, 47-52 fathoms; 1 mile north of west end of Anacapa Island, 45-46 fathoms;  $10\frac{3}{4}$  miles west of Point Dume, 47-48 fathoms; off Redondo Beach, 96-120 fathoms; east of Long Point, Santa Catalina Island, 35-46 fathoms; off White Cove, 40-80 fathoms; Avalon Bay, 98-116 fathoms; 5 miles SE of Santa Catalina Island, 140-150 fathoms; 5 miles SE of Church Rock, 109-116 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 55-60 fathoms; 8 miles west of Cedros Island, 64-65 fathoms; Ranger Bank, west of Cedros Island, 76-83 fathoms;  $5\frac{1}{2}$  miles south of San Benito Islands, 69-81 fathoms.

*Remarks*.—The species bears much resemblance to *A. traski* (Torrey), even in color, and must be closely related to that species. The main differences are in the shape of the hydrotheca, the distance between successive hydrothecae, and particularly, the distance to the first hydrotheca on the branch.

**Abietinaria traski** (Torrey)

*Sertularia traski* TORREY, Hyd. Pacific Coast, 1902, p. 69.

*Abietinaria traski* FRASER, Hyd. Pacific Coast, 1937, p. 135.

*Distribution.*—6 miles east of South Point, Santa Rosa Island, 28-30 fathoms; 10 miles SE by  $\frac{1}{2}$  E of South Point, 73-75 fathoms; 4.6 miles SW by  $\frac{1}{2}$  W of East Point, 40 fathoms; 3 miles south of Fraser Point, Santa Cruz Island, 20-24 fathoms;  $1\frac{1}{2}$  miles NW of Cavern Point, 54-56 fathoms; 3 miles NW of San Pedro Point, 46-47 fathoms;  $\frac{1}{2}$  mile east of San Pedro Point, 26-40 fathoms;  $3\frac{1}{2}$  miles NE of San Pedro Point, 46-47 fathoms; off Gull Island, 39-43 and 110-140 fathoms;  $\frac{1}{2}$  mile south of Gull Island, 34-41 fathoms; 1 mile SE of Smugglers Cove, 17-20 fathoms;  $2\frac{1}{2}$  miles NW of Anacapa Island, 48-51 fathoms;  $\frac{1}{2}$  mile south of west end of Anacapa Island, 25-26 fathoms; 3 miles NW of Anacapa Island Light, 47-52 fathoms;  $\frac{3}{4}$  miles SE of Cat Rock, 23-25 fathoms; NE of Anacapa Island, 45 fathoms; 11 miles south of Seal Beach, Calif., 82-95 fathoms;  $1\frac{3}{4}$  miles west of Catalina Head, Santa Catalina Island, 50-51 fathoms;  $\frac{3}{4}$  miles east of Empire Landing, 46-57 fathoms; 2.8 miles WNW of Long Point, 64-88 fathoms;  $3\frac{1}{2}$  miles WNW of Long Point, 40 fathoms; 7 miles east of Long Point, 228-267 fathoms; off White Cove, 40-80 fathoms; east of White Cove, 121-160 fathoms; SE of Santa Catalina Island, 117-128 fathoms; 5 miles SE of Santa Catalina Island, 140-150 fathoms; 5 miles SE of Church Rock, 117-118 fathoms; 4 miles SE of Church Rock, 109-116 fathoms;  $2\frac{1}{2}$  miles SE of Church Rock, 59-61 fathoms; 1 mile SW of Ben Weston Point, 45-49 fathoms; off Pyramid Cove, San Clemente Island, 55-110 fathoms; south of Pyramid Cove, 55-69 fathoms; off San Nicolas Island, 28-31 and 40-48 fathoms; 4 miles NE of buoy, Cortes Bank, 59-60 fathoms;  $4\frac{1}{2}$  miles WNW of buoy, 90-110 fathoms; 6 miles ESE of buoy, 56 fathoms; 8 miles west of Cedros Island, 61-63 and 64-65 fathoms; Ranger Bank, 76-77 and 78-83 fathoms; off San Benito Islands, 51-52 fathoms.

**Genus DIPHASIA****Diphasia kincaidi** (Nutting)

*Thuiaria elegans* NUTTING, Hyd. Harriman Exped., 1901, p. 187.

*Thuiaria kincaidi* NUTTING, Amer. Nat., 1901, p. 789.

*Diphasia kincaidi* NUTTING, Amer. Hyd., II, 1904, p. 112.

FRASER, Hyd. Pacific Coast, 1937, p. 139.



*Distribution*.—Yaquina Bay, Ore., 2-5 fathoms;  $3\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 35-38 fathoms; south of Santa Cruz Island, 37-40 fathoms;  $\frac{1}{2}$  mile north of Platt Harbor, 31-37 fathoms; 1 mile south of Gull Island, south of Santa Cruz Island, 34-41 fathoms; 1 mile WNW of Anacapa Island, 43-45 fathoms;  $\frac{1}{2}$  mile south of west end of Anacapa Island, 25-26 fathoms; Avalon Bay, Santa Catalina Island, 98-116 fathoms; Pyramid Cove, San Clemente Island, 10 fathoms; off San Nicolas Island, 28-31 and 40-48 fathoms.

### Genus HYDRALLMANIA

#### *Hydrallmania distans* Nutting

*Hydrallmania distans* NUTTING, Hyd. Alaska and Puget Sound, 1899, p. 746.

FRASER, Hyd. Pacific Coast, 1937, p. 140.

*Distribution*.—Near mouth of Salinas River, Monterey Bay, Calif., 10-13 fathoms; off San Pedro breakwater, 14 fathoms; 3 miles off Seal Beach, 14 fathoms; 5 miles SE of Santa Catalina Island, 140-150 fathoms; off San Nicolas Island, 28-31 fathoms; Coronado Beach, San Diego, 6-7 fathoms.

### Genus PASYA

#### *Pasya quadridentata* (Ellis and Solander)

*Sertularia quadridentata* ELLIS and SOLANDER, Nat. Hist. Zooph., 1786, p. 57.

*Pasythea quadridentata* NUTTING, Amer. Hyd., II, 1904, p. 75.

*Pasya quadridentata* FRASER, Hancock Hyd., 1, 1938, p. 50.

FRASER, *ibid.*, 2, 1938, p. 110.

FRASER, *ibid.*, 3, 1938, p. 134.

*Distribution*.—South Bay, Cedros Island, 10-15 fathoms; Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms; off San Juanico Bay, 16 fathoms.

### Genus SELAGINOPSIS

#### *Selaginopsis constans*, new species

Plate 27, Fig. 17

*Trophosome*.—Colony 6 cm, coarse and rigid, as in the other species of *Selaginopsis*; there are no distinct nodes in either stem or branches. There are but few branches, arranged alternately in the distal portion of the colony; each branch is constricted at the base. The arrangement of the hydrothecae is distinctive, as there is the same number of series, 4, in the



stem and in the branches. As the hydrothecae are shaped much like those in *S. cylindrica* (Clark), or perhaps even more like those of *S. pinnata* Mereschowsky, a portion of the branch looks like the proximal portion of the branch of *S. cylindrica* or any part of the branch in *S. pinnata*. On the stem, of course, the arrangement is entirely different since in those two species, there are but two series of hydrothecae. The hydrothecae are almost completely immersed; the entire margin is almost vertical. The operculum consists of a single abcauline flap.

*Gonosome*.—Not observed.

*Distribution*.—Station 1283-41,  $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms; north of Santa Barbara Island, 100 fathoms.

### **Selaginopsis mirabilis** (Verrill)

*Diphasia mirabilis* VERRILL, Amer. Jour. Sc., (3), 5, 1872, p. 9.

*Selaginopsis mirabilis* FRASER, Hyd. Pacific Coast, 1937, p. 145.

*Distribution*.—Puget Sound.

### **Selaginopsis trilateralis** Fraser

*Selaginopsis trilateralis* FRASER, Queen Charlotte Hyd., 1936, p. 504.

FRASER, Hyd. Pacific Coast, 1937, p. 148.

*Distribution*.—NE of Anacapa Island, 50 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 55-60 fathoms.

### **Selaginopsis triserialis** Mereschowsky

*Selaginopsis triserialis* MERESCHKOWSKY, Ann. and Mag. Nat. Hist., (5), II, 1878, p. 435.

FRASER, Hyd. Pacific Coast, 1937, p. 148.

*Distribution*.—3 miles south of Fraser Point, Santa Cruz Island, 20-24 fathoms; Prisoners Harbor, 35-45 fathoms;  $\frac{3}{4}$  mile east of Cat Rock, Anacapa Island, 23-25 fathoms; NE of Anacapa Island, 50 fathoms;  $15\frac{1}{2}$  miles WNW of Santa Barbara Island, 70 fathoms; off San Nicolas Island, 28-31 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 55-60 fathoms.

## **Genus SERTULARELLA**

### **Sertularella amphorifera** Allman

*Sertularella amphorifera* ALLMAN, Gulf Stream Hyd., 1877, p. 22.

FRASER, Atlantic Hyd., 1944, p. 256.

*Distribution*.—9 miles off San Diego, 78-81 fathoms; 8 miles west of Cedros Island, 64-65 fathoms.

**Sertularella clausa** Allman

*Sertularella clausa* ALLMAN, Challenger Hyd., II, 1888, p. 54.

FRASER, Hancock Hyd., 3, 1938, p. 134.

*Distribution*.—Between Wreck and Stephens Bays, Chatham Island, Galapagos, 35 fathoms.

**Sertularella conica** Allman

*Sertularella conica* ALLMAN, Gulf Stream Hyd., 1877, p. 21.

FRASER, Hyd. Pacific Coast, 1937, p. 151.

FRASER, Hancock Hyd., 1, 1938, p. 51.

FRASER, *ibid.*, 3, 1938, p. 134.

*Distribution*.—Off San Pedro; off Navidad Head, Tenacatita Bay, Mexico, 25-35 fathoms; Chacahua Bay, Mexico, 5-10 fathoms; Secas Islands, Panama, 12 fathoms; off Octavia Rocks, Colombia, 45 fathoms; off Bindloe Island, Galapagos, 15 fathoms; off Barrington Island, 48-73 fathoms.

**Sertularella erecta** Fraser

*Sertularella erecta* FRASER, Hancock Hyd., 3, 1938, p. 141.

FRASER, Some California Hyd., 1940, p. 42.

*Distribution*.—3 miles east of South Point, Santa Rosa Island, 17-20 fathoms; Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms.

**Sertularella exilis** Fraser

*Sertularella exilis* FRASER, Hancock Hyd., 1, 1938, p. 51.

*Distribution*.—North of Isla Partida, Gulf of California, 76 fathoms.

**Sertularella formosa** Fewkes

*Sertularella formosa* FEWKES, Bull. Mus. Comp. Zool., Harvard, 1881, p. 130.

FRASER, Hancock Hyd., 1, 1938, p. 52.

FRASER, *ibid.*, 3, 1938, p. 134.

*Distribution*.—Secas Islands, Panama, 2-5 fathoms; Taboga Island, 2-5 fathoms; Pinas Bay, 30-35 fathoms.

***Sertularella fusiformis* (Hincks)**

*Sertularia fusiformis* HINCKS, Ann. and Mag. Nat. Hist., (3), VIII, 1861, p. 253.

*Sertularella fusiformis* FRASER, Hyd. Pacific Coast, 1937, p. 153.

FRASER, Hancock Hyd., 1, 1938, p. 52.

*Distribution*.—East of Point Fermin, Calif., shore; 1 mile NW of White Cove, Santa Catalina Island, 2-3 fathoms.

***Sertularella multinoda*, new species**

Plate 28, Fig. 18

*Trophosome*.—Colony simple, rigid, 2.5 mm, with few branches, similar to the main stem, given off irregularly but alternately. The stem and branches are sinuous; the internodes are short, and the bend takes place at the oblique node. There may be some sign of annulation or wrinkling in the stem and branches. A hydrotheca is given off by each internode, the hydrotheca alternating; as the internode is so short, the hydrotheca is usually longer than the short, opposite side of the internode. The hydrotheca is nearly cylindrical, but is slightly turgid near the base, and slightly contracted below the margin. There are 3 teeth on the margin, usually 2 of them more prominent than the other one; there are 3 opercular flaps. The surface is transversely corrugated, with the rounded corrugations usually visible all around the hydrotheca.

*Gonosome*.—The gonangia appear either on the stem or on the branch; they are elongated oval, 1.4 x 0.6 mm, tapering quite sharply to each end; the distal end forms a short, slender neck, with the terminal aperture small. The whole surface is transversely corrugated, with rounded corrugations.

*Distribution*.—Station 287-34, South Bay, Cedros Island, 10-15 fathoms.

*Remarks*.—The species resembles *Sertularella pinnata* Clark more than any other species recorded from the northeast Pacific, but the colony is not so irregular, the cauline internodes are shorter, the teeth on the margin of the hydrotheca are not so prominent, but the annulation throughout the colony is more in evidence, particularly in the wall of the hydrotheca. The gonangium is on the same general plan, but it is not askew as it is in *S. pinnata*. The differences are too great to indicate very close relationship.

**Sertularella pedrensis** Torrey

*Sertularella pedrensis* TORREY, Hyd. San Diego, 1904, p. 27.

FRASER, Hyd. Pacific Coast, 1937, p. 155.

FRASER, Hancock Hyd., 1, 1938, p. 110.

*Distribution*.—San Miguel Passage, 18-19 fathoms; off Becher Bay, Santa Rosa Island, 10 and 16 fathoms;  $3\frac{1}{2}$  miles east of South Point, 35-38 fathoms;  $6\frac{1}{4}$  miles SE of South Point, 41 fathoms; 6.5 miles SE by E of South Point, 57 fathoms; 3.6 miles south of East Point, 54-55 fathoms; 3 miles south of Fraser Point, Santa Cruz Island, 20-24 fathoms; off Gull Island, 39-43 fathoms; 1 mile north of San Pedro Point, 45-46 fathoms;  $3\frac{1}{2}$  miles NE of San Pedro Point, 46-47 fathoms; Anacapa Passage, 15-50 fathoms; 1 mile WNW of Anacapa Island, 41-43 fathoms; 1 mile north of west end of Anacapa Island, 45-46 fathoms;  $\frac{1}{2}$  mile south of west end of Anacapa Island, 25-26 fathoms; NE of Anacapa Island, 50 fathoms; east of Anacapa Island, 50 fathoms;  $3\frac{1}{2}$  miles south of Hueneme, Calif., 29-30 fathoms;  $\frac{1}{2}$  mile SE of Point Mugu, 26-30 fathoms;  $10\frac{3}{4}$  miles west of Point Dume, 47-48 fathoms; off Redondo Beach, 136-172 fathoms; 3 miles off Seal Beach, 22-28 fathoms; San Pedro Channel, 67-110 fathoms; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; Newport Channel, 4-10 fathoms; San Pedro Channel, 12 miles SW of Newport, 235-250 fathoms; off Abalone Point, Laguna Beach, 129 fathoms; off Eagle Bank, Santa Catalina Island, 40-43 fathoms; 1 mile east of Empire Landing, 15-20 fathoms;  $\frac{1}{2}$  mile east of Willow Cove, 37-44 and 44-50 fathoms; off Isthmus Cove, 59-69 and 80-100 fathoms; off Goat Harbor, 15-20 fathoms; off Emerald Bay, 65-90 fathoms; 2.8 miles WNW of Long Point, 60-68 fathoms;  $\frac{1}{2}$  mile west of Long Point, 21-40 fathoms; off Long Point, 40 and 50 fathoms; west of Long Point, 20-50 fathoms; east of Long Point, 35-46 and 40-80 fathoms; 1 mile east of White Cove, 21 fathoms; off White Cove, 36-41 and 40-80 fathoms;  $1\frac{3}{4}$  miles east of White Cove, 45-50 fathoms; Avalon Bay, 98-116 fathoms; off Bend Rock, 31-40 fathoms; 5 miles SE of Santa Catalina Island, 140-150 fathoms;  $2\frac{1}{2}$  miles SE of Church Rock, 59-61 fathoms; 1 mile SW of Ben Weston Point, 45-49 fathoms; south of Pyramid Cove, San Clemente Island, 55-69 and 55-110 fathoms; off San Nicolas Island, 28-31 and 41-48 fathoms; Tanner Bank, 45-46 fathoms; 4 miles north of Todos Santos Island, Lower Calif., 40 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 20-25 fathoms; 8 miles west of Cedros Island, 61-63 and 64-65 fathoms; Ranger Bank, 76-77 and 78-83 fathoms; off San Benito Islands, 51-52 and 71-95 fathoms; 1 mile south of



San Benito Islands, 44-49 fathoms;  $5\frac{1}{2}$  miles south of San Benito Islands, 66-81 fathoms;  $8\frac{1}{2}$  miles south of San Benito Islands, 71-72 fathoms; 3 miles NW of Natividad Island, 30-31 fathoms; 4 miles north of Dewey Channel, 24-25 fathoms; off Braithwaite Bay, Socorro Island, 17-46 fathoms; north of Clarion Island, 35-36 and 30-40 fathoms; San Jaime Bank, off Cape San Lucas, 75 and 120 fathoms; off Los Frailes, Gulf of California, 5-15 fathoms; Aqua Verde Bay, shore; off White Rock, Isla Partida, 45 fathoms; north of Isla Partida, 10 and 46-75 fathoms; Puerto Refugio, Angel de la Guardia Island, 11-22 and 78-90 fathoms; between Angel de la Guardia and Mejia Islands, 6-11 and 51-54 fathoms; off San Pedro Nolasco Island, 55-57 fathoms; Gulf of Dulce, Costa Rica, 19-48 fathoms.

***Sertularella rugosa* (Linn.)**

*Sertularia rugosa* LINNAEUS, Syst. Nat., 1758, p. 813.

*Sertularella rugosa* FRASER, Hyd. Pacific Coast, 1937, p. 157.

FRASER, Hancock Hyd., 1, 1938, p. 52.

FRASER, *ibid.*, 3, 1938, p. 134.

*Distribution*.—Off Redondo Beach, Calif., east of Point Fermin, shore; Santa Maria Bay, Lower Calif., 5-25 fathoms; off Lobos de Afuera Islands, Peru, shore and 25-30 fathoms.

***Sertularella similis*, new species**

Plate 28, Fig. 19

*Trophosome*.—Colony rigid, 25 mm, or usually much less, unbranched, or with one or two branches given off nearly at right angles, seemingly loosely attached to the stem, as though a planula had settled on the surface and started to grow a colony. There is little or no indication of nodes, but the hydrothecae are given off in regular alternation. The hydrotheca is large, nearly 1.0 mm in length, not extensively immersed, but projecting outward at a wide angle to the stem. There are 4 teeth on the margin, and 4 flaps in the operculum. The special feature is the nature of the transverse corrugations; they are narrow, with a distinct ridge, and hence numerous; they pass all around the hydrotheca.

*Gonosome*.—Not observed.

*Distribution*.—Station 561-36, south of Isla Partida, Gulf of California, 70 fathoms.

*Remarks*.—The trophosome of the species resembles that of *S. conica* Allman in almost every character. The feature difference is the numerous corrugations, so strongly marked, passing all around the hydrotheca, that take the place of the few, incomplete annulations that appear in *S. conica*.



These corrugations are almost as much pronounced as they are in *S. ornata* Fraser, where the hydrotheca is much smaller. It would appear that *S. similis* is a recent derivative of *S. conica*, as it appears within the range of that species, but without the gonangium it is not wise to be too definite in the matter.

***Sertularella sinuosa*, new species**

Plate 28, Fig. 20

*Trophosome*.—The colony is small, growing from a non-reticulate stolon, unbranched, slender, with a maximum height of 20 mm, usually much less than this. The stem is sinuous, divided into regular, short internodes which are slightly oblique, or directly transverse. The hydrothecae are strictly alternate, nearly tubular, but slightly turgid in the proximal portion, turned outward to such an extent that the distal half is almost at right angles with the stem; margin with 3 well-marked, sharp teeth, much like those of *S. tricuspidata* (Alder); operculum of 3 flaps. Like the stem, the hydrothecae are small, 0.5 x 0.16 mm.

*Gonosome*.—The gonangium arises from the aperture of the proximal hydrothecae, there may be 2 on the one stem; it is large, as much as 1.6 mm in length, obovate or elliptical, smooth, with a short pedicel extending from the aperture of the hydrotheca.

*Distribution*.—Off San Pedro, Calif., depth not given;  $\frac{3}{4}$  mile east of South Point, Santa Rosa Island, 17-20 fathoms;  $2\frac{1}{4}$  miles east of South Point, 23-28 fathoms;  $2\frac{1}{2}$  miles east of South Point, 17-18 fathoms; 3 miles east of South Point, 17-20 fathoms; 4.6 miles SW  $\frac{1}{2}$  W of East Point, 40 fathoms;  $4\frac{1}{2}$  miles NE of Sandy Point, 35-36 fathoms; 1 mile SE of Smugglers Cove, Santa Cruz Island, 15-21 fathoms;  $\frac{3}{4}$  mile SE of Cat Rock, Anacapa Island, 23-25 fathoms; Laguna Beach, low tide; 1 mile NW of White Cove, Santa Catalina Island, 2-3 fathoms; off San Nicolas Island, 30 fathoms; west of Dutch Harbor, 8-9 fathoms; Tanner Bank, 25-28 fathoms;  $2\frac{3}{4}$  miles off Point Loma, 9-13 fathoms; South Bay, Cedros Island, 10-15 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms.

*Remarks*.—This species has a habitus much similar to that of *S. turgida*, but the stem is much more slender and correspondingly less rigid than in that species. The species must be considered as aberrant in that the gonangium arises through the aperture of the hydrotheca, in which respect it resembles those in the genus *Synthecium*. It is possible that it should be placed in a new genus.

**Sertularella tenella** (Alder)

*Sertularia tenella* ALDER, Cat. Zooph. Northumberland, 1857, p. 113.

*Sertularella tenella* FRASER, Hyd. Pacific Coast, 1937, p. 158.

FRASER, Hancock Hyd., 1, 1938, p. 53.

FRASER, *ibid.*, 3, 1938, p. 134.

*Distribution.*—Puget Sound; off San Nicolas Island, 28-31 fathoms.

**Sertularella tricuspidata** (Alder)

*Sertularia tricuspidata* ALDER, Ann. and Mag. Nat. Hist., (2), XVIII, 1856, p. 357.

*Sertularella tricuspidata* FRASER, Hyd. Pacific Coast, 1937, p. 159.

*Distribution.*—4.6 miles SW $\frac{1}{2}$ W of East Point, Santa Rosa Island, 40 fathoms; 3 miles south of Fraser Point, Santa Cruz Island, 20-24 fathoms; 1 $\frac{1}{2}$  miles NW of Cavern Point, 54-56 fathoms; 10 $\frac{3}{4}$  miles west of Point Dume, 47-48 fathoms; 3 miles off Seal Beach, 11 fathoms; Avalon, Santa Catalina Island, shore; 2 $\frac{1}{2}$  miles SE of Church Rock, 59-61 fathoms; off San Nicolas Island, 28-31 fathoms; 4 miles north of Todos Santos Island, Lower Calif., 41 fathoms; 8 miles west of Cedros Island, 61-63 and 64-65 fathoms.

**Sertularella turgida** (Trask)

*Sertularia turgida* TRASK, Trans. Calif. Acad. Sc., 1857, p. 113.

*Sertularella turgida* FRASER, Hyd. Pacific Coast, 1937, p. 160.

FRASER, Hancock Hyd., 1, 1938, p. 53.

*Distribution.*—2 $\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms; 2 $\frac{1}{2}$  miles east of South Point, 17-18 fathoms; 4.6 miles SW $\frac{1}{2}$ W of East Point, 40 fathoms; 1 mile south of East Point, 15-16 and 19-20 fathoms; 1 mile east of Smugglers Cove, Santa Cruz Island, 19-20 fathoms; Willow Anchorage, low tide; east of Gull Island, 6-10 fathoms; 3 $\frac{1}{2}$  miles NE of San Pedro Point, 46-47 fathoms; Anacapa Passage, 15-50 fathoms;  $\frac{3}{4}$  mile SE of Cat Rock, Anacapa Island, 23-25 fathoms; 3 $\frac{1}{2}$  miles south of Hueneme, 29-30 fathoms; 1 mile east of Santa Barbara Island, 20-40 fathoms; 4 miles east of Landing, 40 fathoms; off Redondo Beach; off San Pedro breakwater, 4 fathoms; off Anaheim; San Pedro Channel, 67-110 fathoms; 5 miles—152° from San Pedro breakwater, 17-19 fathoms; Newport Channel, Balboa Peninsula, landing float; 3.5 miles WNW of Long Point, Santa Catalina Island, 40 fathoms;  $\frac{1}{2}$  mile off White Cove, 33-37 fathoms; 1 mile SW of Ben

Weston Point, 45-49 fathoms; north of Santa Catalina Island, 50 fathoms; off Wilson Cove, San Clemente Island, 52-61 fathoms; south of Pyramid Cove, 55-69 fathoms; off San Nicolas Island, 28-31 fathoms; 11 miles NW of buoy, Cortes Bank, 45-46 fathoms; 1 mile south of San Benito Islands, 44-49 fathoms;  $8\frac{1}{2}$  miles south of Dewey Channel, Lower Calif., 49 fathoms.

### Genus SERTULARIA

#### *Sertularia cornicina* (McCrady)

*Dynamena cornicina* MCCRADY, Gymno. Charleston Har., 1859, p. 204.

*Sertularia cornicina* FRASER, Hyd. Pacific Coast, 1937, p. 161.

FRASER, Hancock Hyd., 1, 1938, p. 54.

FRASER, *ibid.*, 2, 1938, p. 110.

FRASER, *ibid.*, 3, 1938, p. 135.

*Distribution.*—Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms.

#### *Sertularia dalmasi* (Versluys)

*Thuiaria sertularioides* ALLMAN, Gulf Stream Hyd., 1877, p. 28.

*Desmoscyphus dalmasi* VERSLUYS, Mem. Soc. Zool. France, 1899, p. 38.

*Sertularia rathbuni* NUTTING, Amer. Hyd., II, 1904, p. 57.

*Sertularia dalmasi* FRASER, Atlantic Hyd., 1944, p. 286.

*Distribution.*—South Bay, Cedros Island, 10-15 fathoms.

#### *Sertularia desmoides* Torrey

*Sertularia desmoidis* TORREY, Hyd. Pacific Coast, 1902, p. 65.

*Sertularia desmoides* TORREY, Hydroids San Diego Region, 1904, p. 30.

*Sertularia desmoides* FRASER, Hyd. Pacific Coast, 1937, p. 161.

FRASER, Hancock Hyd., 1, 1938, p. 54.

FRASER, *ibid.*, 2, 1938, p. 110.

*Distribution.*—Pacific Grove, Calif.; south of San Miguel Island, 15-24 fathoms; 1 mile south of Cardwell Point, 15-24 fathoms; 3 miles east of South Point, Santa Rosa Island, 17-20 fathoms; 1 mile south of East Point, 15-16 fathoms; 3 miles SW of Fraser Point, Santa Cruz Island, 15-19 fathoms; 1 mile east of Smugglers Cove, 19-20 fathoms; east of Gull Island, 6-10 and 11-19 fathoms;  $\frac{1}{2}$  mile south of west end of Anacapa Island, 25-26 fathoms;  $1\frac{1}{2}$  miles SE of Point Mugu, 26-30 fathoms; east of Santa Barbara Island, 19-20 fathoms; off Redondo

Beach; east of Point Fermin, shore; off Anaheim; off Huntington Beach, 4-20 fathoms; 5 miles—152° from San Pedro breakwater, 17-19 fathoms; off Isthmus Cove, Santa Catalina Island, 80-100 fathoms; 5 miles SE of Catalina Island, 140-150 fathoms; off San Nicolas Island, 28-31 fathoms; west of Dutch Harbor, San Nicolas Island, 8-9 fathoms; Tanner Bank, 25-28 fathoms; 7½ miles south of Point Loma, 30-33 fathoms; South Bay, Cedros Island, 10-15 fathoms; Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms; south of Isla Partida, Gulf of California, 20 fathoms; off White Rock, Isla Partida, 45 fathoms; north of Isla Partida, 10 fathoms; off Navidad Head, Tenacatita Bay, Mexico, 25-35 fathoms; Petatlan Bay, shore.

### *Sertularia exigua* Allman

*Sertularia exigua* ALLMAN, Gulf Stream Hyd., 1877, p. 24.

FRASER, Hancock Hyd., 1, 1938, p. 54.

FRASER, *ibid.*, 3, 1938, p. 135.

*Distribution.*—Off Abalone Point, Laguna Beach, Calif., 54-57 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms; off Santa Maria Bay, 18-25 fathoms; north of Isla Partida, Gulf of California, 10 fathoms; off Consag Rock, 40-45 fathoms; Magdalena Island, Tres Marias Islands, Mexico, 13 fathoms; Tangola Tangola, shore.

### *Sertularia furcata* Trask

*Sertularia furcata* TRASK, Proc. Calif. Acad. Sc., 1857, p. 112.

FRASER, Hyd. Pacific Coast, 1937, p. 162.

FRASER, Hancock Hyd., 1, 1938, p. 55.

FRASER, *ibid.*, 2, 1938, p. 110.

FRASER, *ibid.*, 3, 1938, p. 135.

*Distribution.*—2½ miles east of South Point, Santa Rosa Island, 17-18 fathoms; 1 mile south of East Point, 15-16 fathoms; 4 miles east of Landing, Santa Barbara Island, 40 fathoms; off Santa Monica, on drift; 3 miles off Seal Beach, 11 fathoms; in the channel, Newport Inlet, 4-10 fathoms; 5 miles—152° from San Pedro breakwater, 17-19 fathoms; Avalon Bay, Santa Catalina Island; west of Dutch Harbor, San Nicolas Island, 8-9 fathoms; San Quentin Bay, Lower Calif., 3-5 fathoms; 1½ miles north of Cedros Island, 45-55 fathoms; Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-24 fathoms.



**Sertularia inflata** (Versluys)

*Desmoscyphus gracilis* ALLMAN, Challenger Hyd., II, 1888, p. 71.

*Desmoscyphus inflatus* VERSLUYS, Mem. Soc. Zool. France, 1899, p. 42.

*Sertularia versluysi* NUTTING, Amer. Hyd. II, 1904, p. 53.

FRASER, Hancock Hyd., 1, 1938, p. 55.

*Sertularia inflata* FRASER, Atlantic Hyd., 1944, p. 283.

*Distribution*.—Santa Elena Bay, Ecuador, 8-10 fathoms.

**Sertularia mayeri** Nutting

*Sertularia mayeri* NUTTING, Amer. Hyd., II, 1904, p. 59.

FRASER, Hancock Hyd., 1, 1938, p. 55.

*Distribution*.—3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms.

**Sertularia operculata** Linn.

*Sertularia operculata* LINNAEUS, Syst. Nat., 1758, p. 808.

NUTTING, Amer. Hyd., II, p. 54.

FRASER, Hancock Hyd., 3, 1938, p. 135.

*Distribution*.—Off Lobos de Afuera Islands, Peru, 25-30 fathoms; South Bay, Lobos de Afuera Islands, 12 fathoms.

**Sertularia pourtalesi** Nutting

*Sertularia distans* ALLMAN, Gulf Stream Hyd., 1877, p. 25.

*Sertularia pourtalesi* NUTTING, Amer. Hyd., II, 1904, p. 59.

FRASER, Atlantic Hyd., 1944, p. 286.

*Distribution*.—4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; 8½ miles south of Dewey Channel, 49 fathoms; San Juanico Bay, 24 fathoms.

**Sertularia stabilis**, new species

Plate 29, Fig. 21

*Trophosome*.—Colonies, growing to a height of 4 cm, but usually much less, grow in line from a filiform stolon; two colonies in succession are not far from each other, but the distance between varies. The stem is rigid, erect, branched. There is a pinched node just proximal to the first pair of hydrothecae, but there are no other definite nodes although the stem is constricted between each two pairs of hydrothecae in succession. The branches grow from the back of the stem, not from the side, the



longest 12 mm; they are all in the same plane but are irregularly placed, usually more of them on one side than on the other, but never numerous; except that they are more slender, they are much like the main stem. The hydrothecae are of medium size, 0.65 mm in length, nearly tubular, not curved outward very strongly; on the face the pair is contiguous for about half the length, but on the back there is no such contact, as the hydrothecae are fronto-laterally placed. Two pairs in succession are separated by about one-third of the length of the hydrotheca. There are 2 teeth on the margin, and the operculum has 2 flaps.

*Gonosome*.—Not observed.

*Distribution*.—Station 1075-40, inside Georges Island, near the head of the Gulf of California, 11½-13 fathoms.

### ***Sertularia stookeyi* Nutting**

*Sertularia stookeyi* NUTTING, Amer. Hyd., II, 1904, p. 59.

FRASER, Hancock Hyd., 1, 1938, p. 55.

FRASER, *ibid.*, 3, 1938, p. 135.

*Distribution*.—3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; Puerto Refugio, Angel de la Guardia Island, Gulf of California, shore; east of San Esteban Island, 20-70 fathoms; Santa Elena Bay, Ecuador, 2-7 and 8-10 fathoms; North Seymour Island, Galapagos, shore; Stephens Bay, Chatham Island, 12 fathoms.

### **Genus THUIARIA**

#### ***Thuiaria crisioides* (Lamouroux)**

*Dynamena crisioides* LAMOUROUX, Descr. Polyp. Flex., 1824, p. 613.

*Dynamena tubuliformis* MARKTANNER, Hyd. K. K. Nat. Hof-Museums, 1890, p. 238.

*Thuiaria tubuliformis* FRASER, Hancock Hyd., 1, 1938, p. 56.

FRASER, *ibid.*, 3, 1938, p. 135.

*Thuiaria crisioides* FRASER, Atlantic Hyd., 1944, p. 296.

*Distribution*.—(All samples except those especially noted were obtained by shore collecting.) East of White Friars Islands, Mexico, 5-10 fathoms; Tangola Tangola; Playa Blanca, Costa Rica; Port Parker; Gulf of Dulce; south of Mala Point; Port Culebra; Wafer Bay, Cocos Island; Balboa, Canal Zone; Octavia Bay, Colombia; Cupica Bay; Port

Utria; Bindloe Island, Galapagos, 15 fathoms; NW of North Seymour Island; west coast of South Seymour Island; west coast of James Island; Conway Bay, Indefatigable Island; Osborne Island in Gardner Bay, Hood Island.

**Thuiaria fabricii** (Levinsen)

*Sertularia fabricii* LEVINSEN, Vid. Middel. Natyrh. Foren., 1893, p. 190.

*Thuiaria fabricii* FRASER, Hyd. Pacific Coast, 1937, p. 168.

*Distribution*.—West of Fossil Point, Coos Bay, Ore., 4-6 fathoms.

**Thuiaria insociabilis**, new species

Plate 29, Fig. 22

*Trophosome*.—The colony observed was small, 13 mm; the main stem is neither straight nor rigid. There are 2 branches, 6 mm and 5 mm, both on the same side of the stem; there is a hydrotheca in the axil of each and 1 hydrotheca on the side of the stem between the 2 branches. The branches are more slender than the stem but otherwise resemble it. A process from the stem supports each branch and there is a distinct joint at its terminus; the proximal part of the stem is quite slender. The hydrothecae are alternately arranged, the distance between 2 in succession being about twice the length of the hydrotheca. The hydrotheca is nearly tubular, but tapers slightly towards the margin, curving slightly but regularly from base to margin, almost wholly immersed. There are no noticeable teeth on the margin; the operculum consists of a single, abcauline flap.

*Gonosome*.—Not observed.

*Distribution*.—Station 1273-41, 5 miles NE of Anacapa Island Lighthouse, 125-135 fathoms.

**Thuiaria similis** (Clark)

*Sertularia similis* CLARK, Alaskan Hyd., 1876, p. 219.

*Thuiaria similis* FRASER, Hyd. Pacific Coast, 1937, p. 171.

*Distribution*.—Puget Sound.

**Thuiaria simplex** Fraser

*Thuiaria simplex* FRASER, Hancock Hyd., 1, 1938, p. 55.

FRASER, *ibid.*, 3, 1938, p. 135.

*Distribution*.—Off Cape San Francisco, Ecuador, 15 fathoms; Santa Elena Bay, 8-10 fathoms.

Family **Plumularidae**  
Genus **AGLAOPHENIA**

**Aglaophenia diegensis** Torrey

*Aglaophenia diegensis* TORREY, Hyd. Pacific Coast, 1902, p. 71.

FRASER, Hyd. Pacific Coast, 1937, p. 175.

FRASER, Hancock Hyd., 1, 1938, p. 56.

FRASER, *ibid.*, 2, 1938, p. 111.

*Distribution.*— $\frac{3}{4}$  mile off Cat Rock, Anapa Island, 125-135 fathoms; 5 miles—152° from San Pedro breakwater, 17-19 fathoms; San Diego, shore; off Coronado Beach, San Diego, 6-7 fathoms; San Lorenzo Channel, Gulf of California, 3-5 fathoms; San Francisco Island, shore; north of Isla Partida, 46-75 fathoms; north of Lobos Point, shore; Tepoca Bay, shore; Guaymas Bay, shore and 2-3 fathoms; off Magdalena Island, Tres Marias Islands, Mexico, 13 fathoms; south of San Francisco Island, Ecuador, 47 fathoms.

**Aglaophenia dispar**, new species

Plates 29, 30, Fig. 23

*Trophosome.*—Colony consists of a somewhat slender, lax stem, 12 cm, with several long branches on each side, irregularly arranged; occasionally smaller, secondary branches appear. The stem is divided regularly into short internodes by nodes so deeply cut that the end of the internode appears to be rounded; each internode bears a hydrocladium, centrally placed, well forward on the face, so that the angle between two alternate hydrocladia at the base is small. The hydrocladia are relatively short, the longest 8 mm, but most of them are considerably less than this. The nodes here are also well marked but not so distinctly cut as they are on the stem or branch. There is a slight indication of a septum opposite the intrathecal septum, but there are no others. The hydrotheca is short and stout, with the septum very short. The margin is provided with 11 much dissimilar teeth; the median is short but sharp and is retrorse; the first lateral is much longer than any of the others and is also sharp but not so distinctly so as the median; the second lateral is the shortest of the lot; the third and fourth are much the same shape as the second, but at least twice as large; the fifth is as high as the third or fourth but is more slender; all of these are sharp pointed. The supracalycine nematophores are smaller than usual, not reaching the margin of the hydrotheca; the mesial nematophore is in contact with the face of the hydrotheca for fully three-fourths of its

length, and then projects outward, nearly at right angles to the face of the hydrotheca; the 3 cauline nematophores on each internode are of the usual type.

*Gonosome*.—The corbula is of median size with 8 pairs of leaves; except for the taper at the proximal end it is nearly cylindrical. The nematophores are rather small and farther apart than usual; the basal one does not form a spur, but there is a perforation on the proximal side of the ridge opposite it. There are 2 hydrothecae between the corbula and the stem.

*Distribution*.—Station 885-38, San Luis Obispo Bay, Calif., 8-14 fathoms; near mouth of the Salinas River, Monterey Bay, 10-13 fathoms; off Point Arguello, 15-30 fathoms; off El Segundo, 30-31 fathoms; off Huntington Beach, 3-5 fathoms.

### ***Aglaophenia diversidentata*, new species**

Plate 30, Fig. 24

*Trophosome*.—The largest fragment of a colony obtained was 4 cm in height; the hydrocladia up to 9 mm, are well spread out so that possibly the colony is larger than the average. The stem is dark horn color, and the hydrocladia are almost white; the stem is divided into regular internodes by nodes that are not strongly marked, each of which gives off a hydrocladium, farther from the distal node than usual, frontally placed, projecting forward at first but soon curving so that the main part of each is in much the same plane as the stem and the hydrocladium on the other side of the stem. In the hydrocladia the nodes are rather faint but distinct. The hydrothecae are placed quite close together as they occupy all of the internodes. There is 1 short internodal septum opposite the hydrothecal septum. The distal end of the hydrotheca projects well outward but even at the margin the diameter is not as great as the length. The septum is distinct but short. The margin provides the distinctive feature. There are 9 teeth present, but they are strongly diverse; the median tooth is quite small, and is acute; the first lateral is large, rounded at the tip, and projects well forward, often entirely hiding the median tooth from a lateral view; there is a deep, broad sinus between the first and second lateral; the second and third laterals are much the same size, long and slender, acute but not very sharp pointed; the sinus between the two is quite narrow; the fourth lateral is quite low, sometimes scarcely showing,



separated from the third by a broad but shallow sinus. The supracalycine nematophore overtops the margin of the hydrotheca; the mesial nematophore is attached to the hydrotheca for about two-thirds of the length of the hydrotheca and then projects definitely outward and is rounded at the tip. Of the 3 cauline nematophores on each internode, the 2 at the base of the hydrocladial process differ in size; the third is farther down the internode than usual; they are all tubular.

*Gonosome*.—The corbula is small, with 6 pairs of leaves, the edges of which do not meet evenly in the middle line; the nematophores are farther apart and more pointed than usual. There is 1 thecate internode between the corbula and the stem.

*Distribution*.—From piles of Standard Oil Pier, San Diego Bay, littoral on ascidians.

### ***Aglaophenia epizoica*, new species**

Plate 30, Fig. 25

*Trophosome*.—Colonies may reach a height of 20 cm, or possibly even more, but this description was taken from a specimen 4.5 cm in height; this specimen with others like it were scattered over the surface of the body and appendages of a crab; the stem is stout and quite rigid, divided into short internodes by well marked nodes; each internode gives rise to a hydrocladium, the hydrocladia being arranged alternately; each hydrocladium arises from a process well on the face of the stem, so that the angle between two in succession is quite small; very soon the hydrocladia curve outward, so that, apart from the proximal portions, all of them are nearly in the same plane; they project forward or upward but little so that they are nearly at right angles to the stem; they are quite rigid also so that the whole colony has a stiff appearance. The hydrocladium may be 1.5 cm in length, but a grading in length takes place so that the colony is symmetrical plumose. The nodes are somewhat oblique and quite well marked. There is little sign of septa except just oposite the hydrothecal septum. The hydrotheca is large, the distal portion projecting so much that the hydrotheca is almost triangular, with the margin almost as broad as the hydrotheca is long. The horizontal septum is strongly marked and reaches nearly all the way across the hydrotheca. The margin is provided with 11 teeth; the median is smaller than the others and is sharp-pointed; it is almost erect; the first lateral is much larger and projects well forward; the sinus between the first and second lateral is wider



than any of the others, but it is shallower; the second, third and fourth laterals do not differ much in size or shape; they are rounded at the tip; the fifth is smaller than any of the other laterals and is more sharply pointed. The supracalcine nematophores are of medium size, curved, reaching to the margin of the hydrotheca or slightly beyond; the mesial nematophore is adherent to the face of the hydrotheca for about three-fourths of its length, and then projects sharply outward, the total length being much the same as the length of the face of the hydrotheca; there is a distinct septum between the nematophore and the hydrotheca throughout the whole length of the adherent portion. The 3 cauline nematophores on each internode do not differ materially from the usual type.

*Gonosome*.—The corbula is large, up to 15 pairs of leaves, elongated elliptical, the taper being slightly more pronounced proximally than distally; there are no perforations between successive pairs of leaves; the basal nematophore on each leaf projects somewhat to form an inconspicuous spur. There are 2-4 hydrothecae between the corbula and the stem.

*Distribution*.—Station 1296-41, 1 mile east of Smugglers Cove, Santa Cruz Island, 19-20 fathoms; 1 mile north of Point Bennett, San Miguel Island, 40-46 fathoms;  $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms;  $2\frac{1}{2}$  miles east of South Point, 17-18 and 15-20 fathoms; 1 mile south of East Point, 15-16 fathoms; 2.6 miles east of East Point, 47-49 fathoms;  $6\frac{1}{4}$  miles SE of East Point, 46 fathoms; 3 miles SE of Fraser Point, Santa Cruz Island, 15-19 fathoms; 0.3 miles west of Pelican Bay, 35 fathoms; 1 mile north of San Pedro Point, 45-46 fathoms;  $3\frac{1}{2}$  miles NE of San Pedro Point, 46-47 fathoms;  $\frac{1}{2}$  mile east of San Pedro Point, 26-40 fathoms;  $\frac{1}{2}$  mile north of Platt Point, 36-47 fathoms; east of Gull Island, 11-19 fathoms; Anacapa Passage, 25-26 fathoms; north of Anacapa Island, 15 fathoms; 1 mile north of west end of Anacapa Island, 45-46 fathoms; 1 mile south of west end of Anacapa Island, 25-26 fathoms; NE of Anacapa Island, 45 fathoms; east of Santa Barbara Island, 41-47 fathoms; 1 mile east of Santa Barbara Island, 20-40 fathoms; 4 miles east of Landing, Santa Barbara Island, 40 fathoms;  $3\frac{1}{2}$  miles— $238^{\circ}$  off Huntington Beach, 74-77 fathoms; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; south of San Nicolas Island, 20-34 fathoms; Dutch Harbor, 15-22 fathoms; 9 miles off San Diego, 78-81 fathoms; San Diego Bay, 5-7 fathoms; Ranger Bank, west of Cedros Island, 78-83 fathoms; 1 mile south of San Benito Islands, 40-49 fathoms;  $5\frac{1}{2}$  miles south of San Benito Islands, 69-81 fathoms.

**Aglaophenia fluxa**, new species

Plate 31, Fig. 26

*Trophosome*.—Colony consists of a long, slender, lax stem, 20 cm, and 1 or more branches, that may be almost as long as the main stem; from the main stem and the primary branches, scattered, short branches are given off; all of them are divided into regular, short internodes by well marked nodes; each internode of the stem or branch gives off a hydrocladium, the hydrocladia alternately arranged and fronto-laterally placed. The hydrocladia are relatively short, often not more than 2 mm in length, but sometimes as long as 5 mm, divided into regular, short internodes by slightly oblique nodes. The septa are scarcely developed, only one, opposite the hydrothecal septum, showing. The hydrotheca is short and stout, with only 1 short, intrathecal septum. There are 11 marginal teeth; the median tooth is sharp, strongly retrorse; the first lateral tooth is larger and projects forward; the second is usually smaller, somewhat sharp rather than rounded; the third is larger and more rounded; the fourth is nearly the same shape and size as the third; the fifth is slender and is definitely pointed, often to be seen only with difficulty, as it is so near the rear median line. The supracalcine nematophore is of medium size, scarcely reaching the margin of the hydrotheca; the mesial nematophore is about two-thirds of the length of the face of the hydrotheca, with but a small portion, less than one-fourth, free. The three cauline nematophores are of the usual type.

*Gonosome*.—The corbula is 3 mm in length, and 1.25 mm in greatest depth; it is slightly greater in the proximal portion than in the distal; there are 10 pairs of leaves; there are no perforations and the basal nematophore does not form a spur. There are 2 hydrothecae between the corbula and the stem.

*Distribution*.—Station 1241-41, 7½ miles south of Point Loma, Calif., 30-33 fathoms; off Redondo Beach; 2 miles off Belmont Pier, 7-10 fathoms; 3 miles off Seal Beach, 11 fathoms; off Huntington Beach, 4-20 fathoms; 6 miles SE of San Pedro breakwater, 20-21 fathoms; off San Nicolas Island, 28-31 fathoms. All in southern California waters.

**Aglaophenia inconspicua** Torrey

*Aglaophenia inconspicua* TORREY, Hyd. Pacific Coast, 1902, p. 72.

FRASER, Hyd. Pacific Coast, 1937, p. 176.

FRASER, Hancock Hyd., 1, 1938, p. 56.

*Distribution*.—3 miles SE of Cat Rock, Anacapa Island, 23-25 fath-

oms; east shore of Santa Barbara Island; off Redondo Beach; off San Pedro breakwater, 14 fathoms; 3 miles off Seal Beach, 11 fathoms; in channel, Newport Harbor, 4-10 fathoms; 7 miles east of Long Point, Santa Catalina Island, 228-267 fathoms; 1 mile NW of White Cove, 2-3 fathoms; south of San Nicolas Island, 20-34 fathoms; 2 miles NW of buoy, Cortes Bank, 42-45 fathoms; San Diego, shore;  $4\frac{3}{4}$  miles east of Coronado Islands, 14 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 45-55 fathoms; South Bay, Cedros Island, 10-15 fathoms; Turners Island, off Tiburon Island, Gulf of California, shore; off Rocky Point, Sonora, 10 fathoms.

*Aglaophenia integriseptata*, new species

Plate 31, Fig. 27

*Trophosome*.—The symmetrical colony reaches a height of 11 cm; the dark horn-colored stem is divided into regular internodes by well marked nodes. The hydrocladial processes are so near the middle line on the face of the stem that they form a zigzag series, but each hydrocladium turns quite abruptly outward so that those on the two sides are nearly in the same plane for the greater part of their length. The hydrocladia, of a lighter color than the stem, are regularly graded in length, the longest 1.2 mm. The internodes are relatively short and there are no noticeable septa except for a slight indication opposite the hydrothecal septum. The hydrotheca is short and stout, of much greater diameter at the margin than at the base.\* There are 9 teeth on the margin; the median tooth is small and sharp, slightly retrorse, but appearing to be more so since the first lateral tooth is much longer and projects markedly outward; the second lateral is the smallest, the third and fourth being nearly equal, as broad but not as long as the first lateral. The supracalycine nematophore is not large and does not reach past the margin of the hydrotheca; the mesial nematophore is almost as long as the face of the hydrotheca, in contact with this for at least three-fourths of its length, and then turning outward. In some instances, if not in all, there are but 2 nematophores on each cauline internode.

*Gonosome*.—The corbula is not large, with 7 or 8 pairs of leaves, quite definitely cylindrical, with the length, 2.4 mm, little more than twice the diameter. There are no perforations or spur-like nematophores

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\* The septum is complete, straight but oblique, the end at the face of the hydrotheca being the more distant from the base.

at the base of the leaves. There is 1 hydrotheca between the corbula and the stem.

*Distribution*.—Station 1008-39, off San Benito Islands, 51-52 fathoms; 1 mile north of west end of Anacapa Island, 45-46 fathoms;  $10\frac{3}{4}$  miles west of Point Dume, Calif., 47-48 fathoms; 1 mile east of Santa Barbara Island, 20-40 fathoms; off San Benito Islands, 51-52 fathoms;  $5\frac{1}{2}$  miles south of San Benito Islands, 71-72 and 66-81 fathoms.

### ***Aglaophenia late-septata*, new species**

Plate 32, Fig. 28

*Trophosome*.—Colony relatively small, 3.5 cm, is rigid and prim; as the hydrocladia are quite uniform in length, 4 mm, except for a small portion proximally and distally, where a rapid tapering takes place; although the stem is stiff, it is not very short; the nodes are not distinct. The hydrocladia are given off in regular alternation; they are fronto-laterally placed, but as they turn outward almost at once, the angle between those on the two sides is a large one. The hydrocladial internodes are short, the nodes quite well marked; two septa are indicated. The hydrotheca projects outward towards the margin; it is relatively stout; the intrathecal septum reaches all the way across the hydrotheca; it is straight and is especially thick; it is placed low in the hydrotheca. The margin is irregular; in some cases, there is evidence of 11 teeth present, but in general the irregularities are scarcely prominent enough to be called teeth; the median tooth is slightly more prominent in most cases, and is sharper than any of the others. The supracalycine nematophore is large, pear-shaped, reaching above the margin of the hydrotheca; the mesial nematophore is not as long as the face of the hydrotheca, the free portion projecting well outward. The 3 cauline nematophores on each internode are large and tend to be triangular rather than tubular.

*Gonosome*.—The corbula is cylindrical, more than 3 mm in length, with 11 or 12 pairs of leaves. There is no definite spur at the base of the leaf. There are 2 hydrothecae between the corbula and the stem.

*Distribution*.—Station 1121-40, off San Nicolas Island, Calif., 40-48 fathoms;  $3\frac{1}{2}$  miles east of South Point, Santa Rosa Island, 35-38 fathoms;  $\frac{1}{2}$  mile south of Gull Island, Santa Cruz Island, 34-41 fathoms;  $\frac{1}{2}$  mile east of Abalone Point, Laguna Beach, 44-46 fathoms; off San Nicolas Island, 28-31 fathoms; 11 miles NW of buoy, Cortes Bank, 45-46 fathoms;  $9\frac{1}{2}$  miles NW of buoy, Cortes Bank, 50 fathoms;  $4\frac{1}{2}$  miles WNW of buoy, Cortes Bank, 90-110 fathoms; Tanner Bank, 25-28 and 37-40 fathoms.



**Aglaophenia latirostris** Nutting

*Aglaophenia latirostris* NUTTING, Amer. Hyd., I, 1900, p. 101.

FRASER, Hyd. Pacific Coast, 1937, p. 177.

FRASER, Hancock Hyd., 2, 1938, p. 111.

*Distribution*.—Off San Pedro; off San Jose Point, Guatemala, 12-13 fathoms.

**Aglaophenia longicarpa** Fraser

*Aglaophenia longicarpa* FRASER, Hancock Hyd., 2, 1938, p. 112.

FRASER, *ibid.*, 3, 1938, p. 135.

*Distribution*.—Off Isabel Island, Mexico, 10-15 fathoms.

**Aglaophenia lophocarpa** Allman

*Aglaophenia lophocarpa* ALLMAN, Gulf Stream Hyd., 1877, p. 41.

FRASER, Hyd. Pacific Coast, 1937, p. 177.

FRASER, Hancock Hyd., 2, 1938, p. 111.

*Distribution*.—1 mile north of west end of Anacapa Island, 45-46 fathoms;  $3\frac{1}{2}$  miles south of Hueneme, Calif., 29-30 fathoms; off Huntington Beach, 4-20 fathoms;  $3\frac{1}{4}$  miles off Huntington Beach, 17-18 fathoms;  $11\frac{1}{2}$  miles SE of Long Beach, 52 fathoms; 7 miles east of Long Point, Santa Catalina Island, 230-240 fathoms; off Coronado Beach, San Diego, 5-7 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 55-60 fathoms; Ranger Bank, west of Cedros Island, 76-77 fathoms;  $7\frac{1}{2}$  miles SSW of Natividad Island, Lower Calif., 63-66 fathoms; off San Pedro Nolasco Island, Gulf of California, 55-57 fathoms.

**Aglaophenia octocarpa** Nutting

*Aglaophenia octocarpa* NUTTING, Amer. Hyd., I, 1900, p. 103.

FRASER, Hyd. Pacific Coast, 1937, p. 178.

FRASER, Hancock Hyd., 2, 1938, p. 111.

*Distribution*.— $7\frac{1}{2}$  miles south of Point Loma, Calif., 30-33 fathoms.

**Aglaophenia pinguis** Fraser

*Aglaophenia pinguis* FRASER, Hancock Hyd., 2, 1938, p. 113.

*Distribution*.— $6\frac{1}{4}$  miles SE of South Point, Santa Rosa Island, 46 fathoms; off El Segundo, Calif., 28-32 fathoms; off Huntington Beach, 10 fathoms; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; 2 miles SE of Cedros Island Light, 47-55 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; Dewey Channel, opposite



San Eugenio Point, 21-24 fathoms; 3 miles NW of Natividad Island, 30-31 fathoms; San Lorenzo Channel, Gulf of California, 3-5 fathoms; Ballenas Bay, Espiritu Santo Island, shore; north of Isla Partida, 75 fathoms; east of San Francisco Island, 47 fathoms; off Isabel Island, Mexico, 10-15 fathoms.

*Remarks.*—The prominence of the teeth on the margin of the hydrotheca in this species is quite variable. In the original description the number of teeth was given as 8, as the median tooth was so small in the specimen described that it was overlooked. It is never prominent, but in some specimens it shows up definitely. The other teeth may be somewhat similarly reduced so that the margin becomes a mere wavy line. In the original description, "Two intrathecal ridges well marked," should, of course, read "Two internodal ridges." The intrathecal septum is well marked and may reach all the way across the hydrotheca.

***Aglaophenia pluma* (Linn.)**

*Sertularia Pluma* LINNAEUS, Syst. Nat., 1767, p. 1309.

*Aglaophenia pluma* FRASER, Hyd. Pacific Coast, 1937, p. 179.

*Distribution.*— $\frac{3}{4}$  mile south of Cat Rock, Anacapa Island, 23-25 fathoms; Tanner Bank, 37-40 fathoms.

***Aglaophenia prominens* Fraser**

*Aglaophenia prominens* FRASER, Hancock Hyd., 3, 1938, p. 142.

*Distribution.*—1 mile south of Point Bennett, San Miguel Island, 45-46 fathoms;  $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms;  $2\frac{1}{2}$  miles east of South Point, 17-18 fathoms; 3 miles east of South Point, 17-20 fathoms; east of Smugglers Cove, Santa Cruz Island, 19-20 fathoms;  $4\frac{3}{4}$  miles east of Coronado Islands, Mexico, 14 fathoms.

***Aglaophenia propinqua* Fraser**

*Aglaophenia propinqua* FRASER, Hancock Hyd., 2, 1938, p. 114.

*Distribution.*—Agua Verde Bay, Gulf of California, shore and 10 fathoms; Ensenada de San Francisco, 15-18 fathoms.

***Aglaophenia struthionides* (Murray)**

*Plumularia struthionides* MURRAY, Ann. and Mag. Nat. Hist., (3), V, 1860, p. 114.

*Aglaophenia struthionides* FRASER, Hyd. Pacific Coast, 1937, p. 180.

FRASER, Hancock Hyd., 2, 1938, p. 111.

FRASER, *ibid.*, 3, 1938, p. 135.

*Distribution*.—Tyler Point, San Miguel Island, shore; Santa Cruz Channel, 32-34 fathoms; off Redondo Beach, Calif.; off San Pedro breakwater, 4 fathoms; off Huntington Beach, 10 fathoms; 5 miles—152° from San Pedro breakwater, 17-19 fathoms; west of Dutch Harbor, San Nicolas Island, 8-9 fathoms; San Quentin Bay, Lower Calif., 8-9 fathoms; Rosario Bay, 10-15 fathoms.

***Aglaophenia triplex*, new species**

Plate 32, Fig. 29

*Trophosome*.—Colonies grow in clusters to a height of 8 cm; they are quite symmetrical but the plume is tapered farther and more gradually than is common in the genus. The stem is not a very dark horn color but it is much darker than the hydrocladia. Nodes are indicated but are not strongly marked. The hydrocladia are fronto-laterally placed, in regular alternation; the processes on the two sides are at an angle of nearly 90° to each other; from the process the hydrocladium curves outward, and continues to do so; in consequence, the plume does not appear as a plane surface. The nodes of the hydrocladium are indistinct or absent, but in what corresponds to an internode, there are 2 partial septa, 1 at the base of the supracalycine nematophore, and the other opposite the hydrothecal septum. The hydrotheca is of medium length and width, not projecting outward strongly. The intrathecal septum is well marked, reaches about half way across the hydrotheca, and is curved, the concave side facing towards the margin. The teeth on the margin provide the special feature; there are 9 of them. Instead of having a single median tooth, there are 3 much similar, small, sharp-pointed teeth, forming nearly a straight line across the face of the hydrotheca; the 3 on each side that are truly lateral, are much larger than each of these frontal teeth; they are rounded and similar; the first of these projects forward so well that, in a direct, lateral view, the frontal teeth are entirely hidden. Of the 3 groups of 3 teeth, those in the 2 lateral groups, similar in themselves, are quite different to those in the frontal group. The supracalycine nematophores are large, overtopping the margin of the hydrotheca; the mesial nematophore is only slightly shorter than the face of the hydrotheca, with but a small portion projecting. The 3 cauline nematophores on each internode are of less than medium size.

*Gonosome*.—Not observed.

*Distribution*.—Station 1075-40, inside Georges Island, near the head of the Gulf of California, 11½-13 fathoms.

*Aglaophenia venusta*, new species

Plate 32, Fig. 30

*Trophosome*.—Colonies, loosely clustered, up to 7 cm in length, arise from a stolon which is slightly reticulated, but the hydrocladia are relatively short, often not more than 3 mm, and they are regular, hence the whole colony is quite graceful. As is often the case in this genus, the stem is much darker horn-colored than the hydrocladia. The stem is divided into regular, short internodes by well marked, transverse nodes; as each internode gives rise to a hydrocladium, the hydrocladia are closer together than usual; they arise from the face of the internode not far from the middle, hence at their origin, two in succession make an acute angle with each other; the principal portions of the hydrocladia on the two sides are nearly in the same plane. The internodes of the hydrocladium are relatively short as well. The partial septa, 2 of them, are well marked but are short; the nodes are transverse. The hydrotheca is much similar to that of *A. longicarpa*, although it is noticeably smaller, less than  $1\frac{1}{2}$  times as long as broad, increasing in diameter from base to margin; the septum is short but distinct. There are 9 teeth on the margin; the median is small and sharp-pointed, erect or slightly retrorse; the first lateral is the longest, projecting forward slightly, so that the tip of the median may sometimes be seen past it; the remaining laterals are more rounded, and although they are distinct, they are not deeply cut. The supracalcine nematophores are suitably small, projecting outward and then upward, just reaching the margin of the hydrotheca; the mesial nematophore is not far from being as long as the face of the hydrotheca; less than one-fourth is free, projecting but little. The 3 nematophores on the cauline internode are similarly tubular; as the internode is short, these are placed quite close together.

*Gonosome*.—The corbula has not the great length that it has in *A. longicarpa*, but it is relatively and actually stouter, little more than twice as long as deep; it has 8-10 pairs of leaves. There are 2 hydrothecae between the corbula and the stem. The corbulae are not particularly plentiful in any one colony, but they are well scattered throughout the length of the stem.

*Distribution*.—Station 970-39, Magdalena Island, Tres Marias Islands, Mexico, 13 fathoms.

## Genus ANTENNELLA

**Antennella avalonia** Torrey

*Antennella avalonia* TORREY, Hyd. Pacific Coast, 1902, p. 74.

FRASER, Hyd. Pacific Coast, 1937, p. 181.

FRASER, Hancock Hyd., 1, 1938, p. 57.

FRASER, *ibid.*, 3, 1938, p. 135.

*Distribution*.—2½ miles east of South Point, Santa Rosa Island, 15-21 fathoms; 3 miles east of South Point, 23-26 fathoms; 5 miles SE of Santa Catalina Island, 140-150 fathoms; 1 mile NW of White Cove, Santa Catalina Island, 31 fathoms; South Bay, Cedros Island, 10-15 fathoms.

**Antennella gracilis** Allman

*Antennella gracilis* ALLMAN, Gulf Stream Hyd., 1877, p. 38.

FRASER, Hancock Hyd., 1, 1938, p. 58.

FRASER, Atlantic Hyd., 1944, p. 315.

*Distribution*.—Off Magdalena Island, Tres Marias Islands, Mexico, 13 fathoms.

## Genus ANTENNULARIA

**Antennularia constricta**, new species

Plate 33, Fig. 31

*Trophosome*.—The plumose colony, 5 cm, has less difference in the relative size of the stem and the hydrocladia than is usual in this genus, because the stem is not very stout and the hydrocladia are not especially slender. The stem is divided into internodes of varying length by nodes so well marked that the stem is definitely constricted where they appear; there may be 1, 2, or 3 hydrocladia arising from an internode. The hydrocladia are arranged in 2 series, in an approach to regular alternation, nearly, but not quite, in the same plane. The hydrocladial process is of medium size, with a definite pseudonematophore. In many of the hydrocladia all of the internodes are thecate, the first one shorter than the others, but in some instances, in the distal part of the hydrocladium, extra nodes may be inserted to divide the long internode into two internodes, the proximal being athecate and the distal thecate; the hydrotheca appears much nearer the distal node; there are no distinct, internodal septa. On the hydrocladial process there are 2 nematophores in the axil, proximal to the pseudonematophore, and 1 distal to this; on the first thecate inter-



node, besides the supracalycine nematophores, there are usually 2 mesial nematophores proximal to the hydrotheca, but none distal to it; on the other, longer internodes, there are 3 nematophores proximal to the hydrotheca. When the long internode is divided into 2 internodes, there are 2 nematophores on the athecate internode, and 1 on the thecate, proximal to the hydrotheca. The number of nematophores on the cauline internodes varies, most commonly there are 3 nematophores on the one side between 2 hydrocladia in succession.

*Gonosome*.—Not observed.

*Distribution*.—Station 1162-40, 11 miles south of Seal Beach, Calif., 82-95 fathoms; Carmel Bay, Calif., 10-40 fathoms; Ranger Bank, west of Cedros Island, 78-83 fathoms; San Jaime Bank, off Cape San Lucas, 120 fathoms.

### ***Antennularia gracilis*, new species**

Plate 33, Fig. 32

*Trophosome*.—The colony is small, both short, 2.5 cm, and slender; the stem is divided into internodes that are not all of the same length; in some cases, there are 2 hydrocladia to the internode, and in others, there are 3, but the hydrocladia are in quite regular alternation, in the same plane. The hydrocladial process is relatively long. The hydrocladium is divided into internodes by noticeably oblique nodes, all of which are thecate; the proximal one shorter than the others. Sometimes the long internode is divided into internodes, the proximal, athecate, with 1 nematophore, and the distal, thecate, also with 1 nematophore. There are no internodal septa visible. The hydrotheca is placed some distance from the distal node. The supracalycine nematophores are relatively long; there is 1 mesial nematophore on the first internode and 2 on each of the others, all proximal to the hydrotheca. On the hydrocladial process, there is a proximal pseudonematophore, centrally placed, a normal nematophore in the axil and 1 distal to the pseudonematophore. There is usually but 1 cauline nematophore between 2 hydrocladia on the same side, nearer the proximal hydrocladium, but sometimes there is also 1 near the distal hydrocladium.

*Gonosome*.—Not observed.

*Distribution*.—Station 1263-41, 1½ miles north of Cedros Island, 45-55 fathoms; ½ mile south of west end of Anacapa Island, 26 fathoms.



**Antennularia inconstans**, new species

Plate 33, Fig. 33

*Trophosome*.—Colonies, loosely clustered, reach a height of 7 cm; the stem is stout, with but few nodes indicated. The slender hydrocladia are biserially arranged, in the same plane, but the relative position of those on the two sides is not at all constant, nor is the distance between two in succession on the same side. The hydrocladial process is of medium length; it usually bears a pseudonematophore and 3 normal nematophores, 2 of them on the shoulder, and the other farther out, but sometimes the single one is missing. All of the internodes are thecate; on the first internode, the hydrotheca is nearly centrally placed, but on the others it is about twice as far from the proximal as the distal. On the first internode, besides the supracalycine nematophores, there are usually 2 proximal, and 1 distal to the hydrotheca, medially placed; in the others, the number is not constant, but most commonly there are 3 median nematophores proximal to the hydrotheca, and none distal to it. The internodal septa, one near each end of the internode, are present, but not very distinctly marked. The number of cauline nematophores between 2 hydrocladia in succession on the same side, is not constant, but is usually 3, unless the distance is short, when more commonly there are but 2.

*Gonosome*.—As is usual in the genus, the gonangia are small; they are obovate, sometimes slightly curved, attached to the shoulder of the hydrocladial process.

*Distribution*.—Station 1084-40, off San Pedro Nolasco Island, Gulf of California, 93-111 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 45-55 and 55-60 fathoms.

**Antennularia inverta**, new species

Plate 34, Fig. 34

*Trophosome*.—Colony, 4.5 cm, grows singly, erect; the stem is divided into regular internodes by well marked nodes, with the stem constricted at the nodes. There are 2 hydrocladia given off each internode in the same plane; in the proximal portion, these are opposite, or at least, sub-opposite, placed near the distal end of the internode; more distally, one of them remains in this position, but the other gets farther and farther from the distal node until finally it is nearer the proximal node; the hydrocladial process is of medium length. The hydrocladia are quite constant in their division into internodes, all of which are thecate, except that the proximal internode is somewhat shorter than the others. The hydro-

theca is placed a short distance from the distal end in each case. The internodal septa are present but are not strongly marked. The supracalcine nematophores present no unusual features; there are 2 mesial nematophores on the first internode and 3 on each of the others, proximal to the hydrotheca. There is the usual pseudonematophore on the hydrocladial process, with a normal nematophore proximal, and one distal to it. On the cauline internodes, the number of nematophores differs; in the proximal portion of the stem, there are most commonly 2 nematophores, not far apart, proximally, and a single one distally, on each side of the internode, but one of these, most commonly the distal one, may be missing. Distally, there may be the same number between 2 hydrocladia on the same side of the stem, but the change in position on the internode, of one of the hydrocladia, displaces to some extent the exact position of some of the nematophores.

*Gonosome*.—Not observed.

*Distribution*.—Station 1276-41,  $10\frac{3}{4}$  miles west of Point Dume, Calif., 47-48 fathoms.

*Remarks*.—This species is very similar to *A. mutabilis* Fraser, but the relative position of the opposite and alternate hydrocladia is inverted, since in *A. mutabilis*, the proximal hydrocladia are alternate and the distal, opposite or sub-opposite. There is no clue as to which species is the older.

### ***Antennularia irregularis* Fraser**

*Antennularia irregularis* FRASER, Hancock Hyd., 1, 1938, p. 59.

FRASER, *ibid.*, 2, 1938, p. 111.

FRASER, *ibid.*, 3, 1938, p. 135.

*Distribution*.—1 mile north of San Pedro Point, Santa Cruz Island, 45-46 fathoms.

### ***Antennularia mutabilis*, new species**

Plate 34, Fig. 35

*Trophosome*.—The slender colony, 7 cm, grows singly; the stem is relatively slender, without distinct nodes. The hydrocladia are in the same plane or nearly so, in the proximal portion of the stem, arranged in quite regular alternation, but in the distal portion, they are definitely decussate. The hydrocladial process is of medium length, about half the length of the first internode; a pseudonematophore is present. The nodes are well marked, but the internodal septa are indistinct or absent. On

most of the hydrocladia, the internodes are all thecate; the first one is shorter than the others, with the hydrotheca near the middle; in the others, the hydrotheca is about one-third the distance from the distal end. Occasionally, in the distal portion of the hydrocladium, an extra node is introduced to divide the normal, long, thecate internode into a proximal, athecate internode and a distal thecate internode. The supracalcine nematophores are rather long; there is 1 mesial nematophore on the first internode, proximal to the hydrotheca, and on the others, 2, or occasionally 3 nematophores; when the extra internode is introduced, 1 nematophore remains with the thecate internode. There are 2 nematophores at the axil of the hydrocladial process, 1 on each side, and a single one farther out than the pseudonematophore. In the proximal part of the stem, there are 2 nematophores between 2 hydrocladia on the same side, and in the distal portion, there are 2 pairs of nematophores a short distance above each pair of processes.

*Gonosome*.—Not observed.

*Distribution*.—Station 1254-40, 8 miles SW of Cedros Island, 63-65 fathoms; in the same general area, 45-46 fathoms.

### ***Antennularia parva*, new species**

Plate 35, Fig. 36

*Trophosome*.—The plumose colony is very small for this genus, only 9 or 10 mm in height; there are few nodes in the stem, irregularly placed; these are as strongly marked as they are in *A. constricta* Fraser. The hydrocladia are arranged in 2 irregular series, an intergrade between the regular alternate, and the decussate arrangement. There is variation in the distance between 2 hydrocladia in succession. The hydrocladial process is shorter than the average. The longest hydrocladium is 4 mm; the division into hydrocladial internodes is not constant, but most frequently, the first 2 internodes are thecate, and then athecate and thecate internodes alternate. The septum near each end of each internode is well marked. In all the thecate internodes except the second, the hydrotheca is placed near the middle of the internode; the second is longer than the others, and appears to include what corresponds to the athecate, and the succeeding thecate, internodes, in the remainder of the hydrocladium, but there is no sign of a node separating the 2 parts; in consequence, the distance from the hydrotheca to the proximal node is at least twice that to the distal. There is a pair of nematophores in the axil of the hydrocladial process, and a single one farther out; in all of the thecate internodes but the sec-

ond, and in all of the athecate internodes, there is a single, mesial nematophore; the supracalycine nematophores present no unusual feature. In most instances, there is a cauline nematophore on each side of the stem between 2 successive hydrocladia.

*Gonosome*.—Not observed.

*Distribution*.—Station 1260-41, Dewey Channel, opposite San Eugenio Point, Lower Calif., 21-26 fathoms.

### ***Antennularia polynema*, new species**

Plate 35, Fig. 37

*Trophosome*.—Colony, long, 13 cm, and rather slender, consists of a stem of medium diameter, constricted at the well marked nodes. Four slender hydrocladia arise from each internode, with a decussate arrangement. The process is of medium length or less, with a well developed pseudonematophore. In most cases, all of the hydrocladial internodes are thecate; the septa are indistinct or absent. The proximal internode is shorter than the others, with the hydrotheca centrally placed. The others are of similar length, with the hydrotheca not far from the distal node. Occasionally, in the distal portion of the hydrocladium, a node may be inserted to divide the internode into two, the proximal being athecate and the distal, thecate. There is a pair of supracalycine nematophores with each hydrotheca; on the proximal internode, there are 2 mesial nematophores proximal to the hydrotheca, and in the other, longer internodes, there are 3 of them. When the long internode is divided by an extra node, 2 nematophores remain on the athecate internode, and 1 on the thecate. There are 2 nematophores in, or near, the axil of the hydrocladial process, and 1 between the pseudonematophore and the node. The cauline nematophores are more numerous than usual; they vary in number, but commonly 3 appear in line between the one process and the next one in line, so that there are 3 nematophores on each side of each internode.

*Gonosome*.—The gonangia are of fair size for the genus, oval or obovate, with a distinct, though short, pedicel. They appear singly or in pairs in the axils of the hydrocladial processes in the proximal half of the colony.

*Distribution*.—Station 1106-40, off San Francisco Island, Gulf of California, 43-44 fathoms;  $\frac{1}{2}$  mile east of San Pedro Point, Santa Cruz Island, 26-40 fathoms; 1 mile SW of Ben Weston Point, Santa Catalina Island, 44-49 fathoms; San Jaime Bank, off Cape San Lucas, 75 fathoms.



***Antennularia reversa* Fraser**

*Antennularia reversa* FRASER, Hancock Hyd., 2, 1938, p. 115.

*Distribution*.—Off Puerto Refugio, Angel de la Guardia Island, Gulf of California, 51-54 fathoms.

***Antennularia septata* Fraser**

Plate 36, Fig. 38

*Antennularia septata* FRASER, Hancock Hyd., 2, 1938, p. 116.

*Gonosome*.—(Not previously described.) There is a sex differentiation in the gonangia similar to that in some species of *Plumularia*. Both types grow from the face of the hydrocladial processes throughout a large portion of the stem. The female gonangium is stout for its length, in the one direction, almost as broad as long, but in the other diameter, the difference is more definite, so that the whole gonangium is flattened; it is obovate, the distal end obtuse, but slightly rounded, the proximal end tapered to a short pedicel. In the male, the gonangium is elongated elliptical, much like that in *Plumularia corrugata* Nutting, or *P. lagenifera* Allman. These male specimens are more slender than those described originally and the cauline nodes are quite distinct.

*Distribution*.—1 mile south of East Point, Santa Rosa Island, 15-16 fathoms; 1 mile south of west end of Anacapa Island, 26 fathoms; San Francisquito Bay, Gulf of California, 20 fathoms; Puerto Refugio, Angel de la Guardia Island, 51-54 fathoms; off Willard Point, Gonzaga Bay, 30-40 fathoms.

***Antennularia tetraseriata* Fraser**

*Antennularia tetraseriata* FRASER, Hancock Hyd., 1, 1938, p. 59.

FRASER, *ibid.*, 2, 1938, p. 116.

FRASER, *ibid.*, 3, 1938, p. 135.

*Distribution*.— $\frac{1}{2}$  mile south of west end of Anacapa Island, 25-26 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 55-60 fathoms; 8 miles west of Cedros Island, 64-65 fathoms; between Angel de la Guardia and Mejia Islands, Gulf of California, 6-11 fathoms; south of San Esteban Island, 25 fathoms.

**Genus CLADOCARPUS*****Cladocarpus* (?) *gracilis*, new species**

Plate 36, Fig. 39

*Trophosome*.—A colony, 10 mm high, is simple, slender, and unbranched; the distal half of the stem is thecate and corresponds to a complete hydrocladium in other species. Just proximal to the first thecate



internode, there are 3 slightly oblique nodes, the distal one of which forms the proximal boundary to the first thecate internode. The 2 internodes bounded by these nodes are quite short, and each is provided with a nematophore. There are no nodes in the remainder of the proximal half of the stem. There are 8 internodes in the distal portion, separated by nodes that are not strongly marked; there are 3 partial septa to each internode, 1 at the base of the supracalycine nematophore, 1 at the base of the hydrotheca, and 1 a little nearer to the base of the hydrotheca than to the base of the nematophore. The hydrotheca is long and slender, with its length more than twice the greatest breadth, the diameter increasing from base to margin; there is a prominent, sharp tooth medially placed on the face of the margin, and the remainder of the margin is irregularly waved or slightly toothed. The supracalycine nematophore is not large, scarcely reaching the margin of the hydrotheca; the mesial nematophore is not adherent to the face of the hydrotheca, but is attached to the internode a short distance below the base of the hydrotheca.

*Gonosome*.—Not observed.

*Distribution*.—Station 1307-41, 2.8 miles WNW of Long Point, Santa Catalina Island, 64-88 fathoms.

*Remarks*.—If a mature colony of this species retains the type of growth shown in this immature colony, a new genus should be established for the species, bearing a relation to *Cladocarpus* much similar to that of *Antennella* to *Plumularia*, but until a mature colony is obtained to settle the matter, the species is placed provisionally with *Cladocarpus*.

The hydrotheca is somewhat like that of *C. vancouverensis* Fraser, but it is more slender; the internode bearing it is much less extensively septate, and the mesial nematophore is quite separate from the base of the hydrotheca.

### ***Cladocarpus moderatus*, new species**

Plate 36, Fig. 40

*Trophosome*.—Colony, 4 cm, is smaller than that in the most of the American species of the genus; the stem is unbranched, but is slightly fascicled in the proximal portion. The hydrocladia appear in regular alternation but not quite in the same plane; they are somewhat flexuous, the bend taking place in the vicinity of the nodes. There is a slight curve backward at the distal end of the hydrotheca, followed by a bend forward that extends past the node, which is oblique; the beginning of the next

bend is at the base of the hydrotheca. The hydrotheca is of medium length and width for the genus, slightly ventricose, and expanding towards the margin. There is an internodal septum at the base of the supracalycine nematophore and at the base of the hydrotheca, and there are 3 others between; they show well in the internode and are indicated in the hydrotheca. On the margin of the hydrotheca, there is a small, sharp, median tooth, but the remainder of the margin is even or nearly so. The supracalycine nematophores are short and curved, reaching but little above the margin of the hydrotheca; each has 2 openings; the 1 mesial nematophore is not attached to the base of the hydrotheca, but is attached to a thickened part of the internode just a short distance below the base of the hydrotheca; it is short, not extending outward farther than the base of the hydrotheca. On the stem, there is a tubular nematophore opposite to, or slightly above, the hydrocladial process, and 3 or 4 in a series between 2 of these in succession.

*Gonosome*.—Not observed.

*Distribution*.—Station 810-38, off Barrington Island, Galapagos, 48-73 fathoms; Avalon Bay, Santa Catalina Island, 98-116 fathoms.

*Remarks*.—This species bears much resemblance to *C. distomus* Clarke, obtained south of Jicarita Island, Panama, 556 fathoms, but the hydrothecae are not so long and slender; there is no nematophore near the distal end of the hydrocladial internode, and the internodal septa are well marked. It may have been derived from *C. distomus* but if an increase in the number and distinctness of the internodal septa is a stable condition in Eastern Pacific species of *Cladocarpus*, it may be that *C. moderatus* is an older species.

### ***Cladocarpus pinguis*, new species**

Plates 36, 37, Fig. 41

*Trophosome*.—Colony consists of a simple stem, usually unbranched, 15 cm, which is divided into regular internodes by fairly well marked nodes; each internode in the distal portion gives rise to a hydrocladium. In the specimen described, all of the hydrocladia with the exception of those on the last 2 cm of the stem were broken off; the longest of those remaining is 8 mm. The alternate hydrocladia are fronto-laterally placed, so that the bases come out at an angle of about 120°. The hydrocladial internodes are relatively short; there are 4 internodal septa strongly marked, 1 at the base of the supracalycine nematophore, 1 near the base of the hydrotheca, and 2 between. The squat hydrotheca is nearly as

broad as it is long, slightly ventricose, with the margin broader than the remainder of the hydrotheca. There is a sharp, median tooth on the margin, and the remainder is irregular with not very definite teeth, except for 1 sharp one about the middle of each side. The supracalycine nematophores are large, extending but slightly past the margin of the hydrotheca; the median nematophore is tubular, straight, not turning up with the face of the hydrotheca, but not projecting far beyond it; it makes an angle of about  $40^\circ$  with the internode; the distal end is squarely cut; near the base, there is a septum extending in from the lower surface. On the stem, there are 3 tubular nematophores on each internode, 1 on each side of the hydrocladial process, and 1 below this process.

*Gonosome*.—The gonangia appear in a single or double series for as much as 3 cm along the stem in the distal portion; they are oval or slightly obovate,  $0.9 \times 0.4$  mm, much similar to those in *C. vancouverensis* Fraser, with the oval apertures latero-terminally placed. The phylactogonia too are similar to those of *C. vancouverensis* but they are not quite so much branched.

*Distribution*.—Station 874-38, NE of Anacapa Island, 45 fathoms; 3 miles east of South Point, Santa Rosa Island, 23-26 fathoms; 3 miles south of Fraser Point, Santa Cruz Island, 20-24 fathoms; 1 mile east of Smugglers Cove, 19-20 fathoms; 1 mile WNW of Anacapa Island, 41-43 fathoms; NE of Anacapa Island, 45 fathoms;  $10\frac{3}{4}$  miles west of Point Dume, Calif., 47-48 fathoms; east of Long Point, Santa Catalina Island, 45-50 fathoms;  $1\frac{3}{4}$  miles east of White Cove, 90-108 fathoms; 1 mile south of San Benito Islands, Lower Calif., 44-49 fathoms;  $5\frac{1}{2}$  miles south of San Benito Islands, 69-81 fathoms.

*Remarks*.—*C. pinguis* may readily be compared with *C. vancouverensis* although in general it is a larger species. The stem and the hydrocladia are much similar although they are stouter; the internodal septa are similarly arranged. The hydrotheca is much stouter for its depth, and the face is not so straight. The margin has a similar, sharp, median tooth, but there is 1 sharp, lateral tooth, not so sharp as the median tooth, about half way along each side. There is little difference in the supracalycine nematophore, but the terminus of the mesial nematophore is truncate, not tapered. The differences in the gonosome are rather immaterial. As the ranges of these two overlap, there is no hesitation in suggesting that *A. pinguis* has been derived directly from *C. vancouverensis*, which has a much wider known range.

**Cladocarpus vancouverensis** Fraser

*Cladocarpus vancouverensis* FRASER, Hyd. V. I. Region, 1914, p. 204.

FRASER, Hyd. Pacific Coast, 1937, p. 182.

*Distribution*.— $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 23-28 fathoms; 6 miles east of South Point, 28-30 fathoms; south of Santa Cruz Island, 37-58, 37-40, and 39-43 fathoms; east of Gull Island, 110-140 fathoms; 1 mile WNW of Anacapa Island, 41-43 fathoms; 3 miles NW of Anacapa Island Light, 47-52 fathoms; 5 miles NE of Anacapa Island Light, 125-135 fathoms;  $10\frac{3}{4}$  miles west of Point Dume, 47-48 fathoms; north of Santa Catalina Island, 50-100 fathoms; off Eagle Bank, 40-43 fathoms;  $3\frac{1}{2}$  miles WNW of Long Point, 182-225 fathoms; off White Cove, 40-80 fathoms; off County Quarry, 56 fathoms; 4 miles SE of Church Rock, 109-116 fathoms; 5 miles south of Church Rock, 117-118 fathoms; off Ship Rock, 7-16 fathoms; 1 mile SW of Ben Weston Point, 45-49 fathoms; off Wilsons Cove, San Clemente Island, 50-150 fathoms; off Pyramid Cove, 10 and 55-69 fathoms; 20 miles south of San Nicolas Island, 65-75 fathoms; 4 miles NE of buoy, Cortes Bank, 59-60 fathoms;  $4\frac{1}{2}$  miles WNW of buoy, 60-61 fathoms; 8 miles west of Cedros Island, 60-75 fathoms; Ranger Bank, west of Cedros Island, 76-77 and 76-83 fathoms; off San Benito Islands, 66-81 fathoms; between the south ends of East and West San Benito Islands, 35 fathoms;  $5\frac{1}{2}$  miles south of San Benito Islands, 66-81 fathoms.

**Genus DIPLOCHEILUS****Diplocheilus allmani** Torrey

*Halicornaria producta* TORREY, Hyd. Pacific Coast, 1902, p. 75.

*Diplocheilus allmani* TORREY, Hyd. San Diego, 1904, p. 36.

FRASER, Hyd. Pacific Coast, 1937, p. 183.

FRASER, Hancock Hyd., 1, 1938, p. 60.

*Distribution*.— $7\frac{1}{2}$  miles south of Point Loma, Calif., 30-33 fathoms.

**Genus LYTOCARPUS****Lytocarpus philippinus** (Kirchenpauer)

*Aglaophenia Philippina* KIRCHENPAUER, Ueber die Hyd. Fam. Plumularidae, I, 1872, p. 45.

*Lytocarpus philippinus* NUTTING, Amer. Hyd., I, 1900, p. 122.

FRASER, Hancock Hyd., 1, 1938, p. 61.

FRASER, *ibid.*, 2, 1938, p. 111.

FRASER, *ibid.*, 3, 1938, p. 135.



*Distribution*.—East of Gull Island, south of Santa Cruz Island, 6-10 fathoms; San Lorenzo Channel, Gulf of California, 3-5 and 6-15 fathoms; outside of Guaymas Bay, 6-10 fathoms; off Tres Marias Islands, Mexico, 13 fathoms; off La Plata Island, Ecuador, 10 fathoms; Sullivan Bay, James Island, Galapagos, 8 fathoms.

### Genus **MONOSTAECHAS**

#### **Monostaechas quadridens** (McCrady)

*Plumularia quadridens* MCCRADY, Gymno. Charleston Har., 1859, p. 199.

*Monostaechas quadridens* NUTTING, Amer. Hyd., I, 1900, p. 75.

FRASER, Hancock Hyd., 1, 1938, p. 61.

FRASER, *ibid.*, 2, 1938, p. 111.

FRASER, *ibid.*, 3, 1938, p. 135.

FRASER, Atlantic Hyd., 1944, p. 334.

*Distribution*.—East of Santa Barbara Island, 36-48 fathoms; South Bay, Cedros Island, 10-15 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; off Braithwaite Bay, Socorro Island, 17-46 fathoms; San Lorenzo Channel, Gulf of California, 3-5 fathoms; Puerto Refugio, Angel de la Guardia Island, 11-22 fathoms; north of Isla Partida, 10 fathoms; Magdalena Island, Tres Marias Islands, Mexico, 13 fathoms; off Navidad Head, 25-35 fathoms; off Cape San Francisco, Ecuador, 15 fathoms.

### Genus **PLUMULARIA**

#### **Plumularia acutifrons** Fraser

*Plumularia acutifrons* FRASER, Hancock Hyd., 1, 1938, p. 61.

*Distribution*.—San Quentin Bay, Lower Calif., 10-15 fathoms.

#### **Plumularia adjecta**, new species

Plate 37, Fig. 42

*Trophosome*.—Colonies grow in small clusters; the stem is stout, and is longer than usual in this genus; the first specimens examined reached a height of 9 cm, but later others were obtained up to 25 cm; it is divided into internodes that are not of uniform length, by nodes which are not very distinctly marked, although they may be observed quite readily. Each internode gives off a hydrocladial process near its distal end, and these hydrocladia are arranged alternately. In the proximal two-thirds or more, the hydrocladia are relatively short, but in the distal portion, they become more elongate, up to 16 mm, and many of these are again



branched irregularly, commonly a greater number on the upper side, although there is but 1 branch to each internode; this secondary branch is short, commonly with a single thecate internode, but sometimes with 2 internodes; each corresponds to the proximal portion of the unbranched hydrocladium. The normal hydrocladium is divided into regular internodes, each node being flanked on each side by a septum. The first internode is short and athecate; all the others are longer and are thecate; the first one is shorter than any of the others; in all cases, the hydrotheca is in the distal third of the internode. In these internodes, there is a well marked septum at the base of the hydrotheca. The supracalycine nematophores are of the usual type; in the first thecate internode, there is 1 mesial nematophore, in all of the others, 2 of these. On the stem there is a nematophore in the axil of the process and 1 on the main part of the internode, on the side opposite to the process, not far from the proximal node.

*Gonosome*.—The gonangia are much like those in several species of this genus, elliptical, but tapering rather abruptly to each end; they grow out from the angle of the hydrocladial processes, and they may be numerous, appearing throughout almost the whole length of the stem; there may even be a pair of them in the 1 axil.

*Distribution*.—Station 1261-41, 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; 3 miles NW of Natividad Island, 30-31 fathoms; Puerto Escondido, Gulf of California, 18-21 fathoms; east of San Marcos Island, 18 fathoms.

*Remarks*.—The secondary branching in this species resembles somewhat that of *P. corrugata* Nutting, but it is more extensive; the hydrocladium itself, however, is quite different in the division into internodes, and in the position of the nematophores; in these respects, it is quite unlike any other Eastern Pacific species, or in the Western Atlantic, so far described.

### ***Plumularia alicia* Torrey**

*Plumularia alicia* TORREY, Hyd. Pacific Coast, 1902, p. 75.

FRASER, Hyd. Pacific Coast, 1937, p. 186.

FRASER, Hancock Hyd., 1, 1938, p. 62.

*Distribution*.—Off Redondo Beach; 3 miles off Seal Beach, 11 fathoms; 2 miles off Belmont Pier, 7-10 fathoms; off Huntington Beach, 5 fathoms; in channel, Newport Harbor, 4-10 fathoms; 5 miles—152° from San Pedro breakwater, 17-19 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms; off Magdalena Island, Tres Marias Islands, Mexico, 13 fathoms.

**Plumularia altithea** Nutting

*Plumularia altithea* NUTTING, Amer. Hyd., I, 1900, p. 58.

FRASER, Atlantic Hyd., 1944, p. 338.

*Distribution*.—Off Octavia Rocks, Colombia, 45 fathoms.

**Plumularia attenuata** Allman

*Plumularia attenuata* ALLMAN, Gulf Stream Hyd., 1877, p. 30.

FRASER, Hancock Hyd., 2, 1938, p. 111.

FRASER, Atlantic Hyd., 1944, p. 338.

*Distribution*.—3 miles NW of Anacapa Island Light, 47-52 fathoms; off San Pedro Nolasco Island, Gulf of California, 95-111 fathoms.

**Plumularia biarmata** Fraser

*Plumularia biarmata* FRASER, Hancock Hyd., 1, 1938, p. 63.

*Distribution*.—Chacahua Bay, Mexico, 45-50 fathoms.

**Plumularia corrugata** Nutting

*Plumularia corrugata* NUTTING, Amer. Hyd., I, 1900, p. 64.

FRASER, Hyd. Pacific Coast, 1937, p. 186.

FRASER, Hancock Hyd., 1, 1938, p. 63.

FRASER, *ibid.*, 2, 1938, p. 111.

FRASER, *ibid.*, 3, 1938, p. 136.

*Distribution*.—1 mile south of Point Bennett, San Miguel Island, 45-46 fathoms; 3 miles east of South Point, Santa Rosa Island, 23-26 fathoms; Bechers Bay, 14-90 fathoms; north of Santa Barbara Island, 37-40 fathoms; south of San Pedro breakwater, 24 fathoms; off Ship Rock, Santa Catalina Island, 7-16 fathoms; off Bend Rock, 31-40 fathoms; south of San Nicolas Island, 20-34 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; Puerto Escondido, Gulf of California, 8-15 fathoms; off Octavia Rocks, Colombia, 45 fathoms; off Cartago Bay, Albemarle Island, Galapagos, in shallow water.

**Plumularia defecta** Fraser

*Plumularia defecta* FRASER, Hancock Hyd., 1, 1938, p. 63.

*Distribution*.—7½ miles south of Point Loma, Calif., 30-33 fathoms; off Isabel Island, Mexico, 10-15 fathoms.

**Plumularia diaphana** (Heller)

*Anisocalyx diaphanus* HELLER, Adriatic Hyd., 1868, p. 42.

*Plumularia alternata* NUTTING, Amer. Hyd., I, 1900, p. 62.

FRASER, Hancock Hyd., 1, 1938, p. 62.

FRASER, *ibid.*, 3, 1938, p. 135.

*Plumularia diaphana* FRASER, Atlantic Hyd., 1944, p. 342.

*Distribution.*—Sulphur Bay, Clarion Island, 12 fathoms; off Isabel Island, Mexico, 10-15 fathoms; off Secas Islands, Panama, 12 fathoms.

**Plumularia exilis**, new species

Plate 38, Fig. 43

*Trophosome.*—Colonies are loosely clustered, growing to a height of 3.5-4.0 cm; the stem is unbranched, slightly sinuous, very slender, divided into long internodes by well marked nodes. The hydrocladia are regularly alternate; as the internode is long, the hydrocladia are distant from one another; supported by a cauline process, almost at the distal end of the internode; the angle with the stem is 45-50°. The hydrocladium is very slender, much similar in diameter to that of *P. tenuissima* Fraser. The nodes are strongly marked, usually flanked by an evident, internodal septum on each side. The first internode is short, athecate, the second is long, with the hydrotheca about two-thirds of the way up; the third internode is athecate, long, but not so long as the thecate internode; after the third, thecate and athecate internodes, like the second and third, alternate. The hydrotheca is correspondingly small. There is no nematophore on the short, proximal internode; on the second, there are 2 mesial nematophores proximal to the hydrotheca, and the 2 supracalycine nematophores; on the athecate internode, there are 2 mesial nematophores; on the stem, there is a nematophore in the axil of the process, as well as 3 or 4 nematophores on each internode on the side opposite the process.

*Gonosome.*—The gonangia are numerous, arising from the main stem near the axil of the hydrocladial process, or from any part of the hydrocladial process, or from any part of the hydrocladium; they are long, up to 1.25 mm, and very slender; they may taper to a small opening at the distal end, or they may be truncate.

*Distribution.*—Station 618-37, San Jaime Bank, off Cape San Lucas, Lower Calif., 75 fathoms; 6½ miles north of Anacapa Island, 125-135 fathoms; east of Anacapa Island, 50 fathoms; NE of Anacapa Island, 45 fathoms; 10¾ miles west of Point Dume, Calif., 47-48 fathoms; east of Long Point, Santa Catalina Island, 45-50 fathoms; 2.8 miles WNW of

Long Point, 64-88 fathoms;  $\frac{1}{2}$  mile west of Long Point, 21-40 fathoms; 1 mile east of White Cove, 21 fathoms; 5 miles SE of Santa Catalina Island, 140-150 fathoms; 5 miles SE of Church Rock, 117-118 fathoms;  $2\frac{1}{2}$  miles SE of Church Rock, 60-80 fathoms; south of Pyramid Cove, San Clemente Island, 55-69 fathoms; Pyramid Cove, 55-69 fathoms; 4 miles north of Todos Santos Island, Lower Calif., 41 fathoms;  $1\frac{1}{2}$  miles north of Cedros Island, 55-60 fathoms; 8 miles west of Cedros Island, 60-65 fathoms;  $8\frac{1}{2}$  miles south of San Benito Islands, 71-72 fathoms; San Jaime Bank, off Cape San Lucas, 120 fathoms; off Los Frailes, Gulf of California, 5-15 fathoms.

**Plumularia floridana** Nutting

*Plumularia floridana* NUTTING, Amer. Hyd., I, 1900, p. 59.

FRASER, Hancock Hyd., 1, 1938, p. 64.

FRASER, Atlantic Hyd., 1944, p. 345.

*Distribution*.—Portuguese Bend, 2 miles east of Point Vicente, Calif., shore.

**Plumularia goodei** Nutting

*Plumularia goodei* NUTTING, Amer. Hyd., I, 1900, p. 64.

FRASER, Hyd. Pacific Coast, 1937, p. 187.

*Distribution*.—1 mile south of East Point, Santa Rosa Island, 15-16 fathoms; off San Nicolas Island, 28-31 fathoms;  $4\frac{3}{4}$  miles east of South Coronado Island, Mexico, 14 fathoms.

**Plumularia inermis** Nutting

*Plumularia inermis* NUTTING, Amer. Hyd., I, 1900, p. 62.

FRASER, Hancock Hyd., 1, 1938, p. 64.

FRASER, Atlantic Hyd., 1944, p. 347.

*Distribution*.—Ranger Bank, west of Cedros Island, 76-77 fathoms.

**Plumularia insolens**, new species

Plate 38, Fig. 44

*Trophosome*.—Colonies in general are small, although some have been examined from off Anacapa Island up to 6 cm. The stem is simple and slender, divided into relatively long internodes by well marked nodes, that may have lightly marked, flanking septa. From the distal end of each internode a hydrocladium is given off; the hydrocladia, therefore, appear in regular alternation all in the same plane. The proximal, hydro-



cladial internode is short, athecate; the second is much longer and is thecate; the third, athecate, is not as long as the second; after this, thecate internodes, like the second, and athecate internodes, like the third, follow in regular alternation. The nodes are flanked on each side with well marked septa. In the thecate internode, there is a characteristic, prominent septum at the base of the hydrotheca. The hydrotheca is nearer the distal end of the internode, but still some distance from the distal node. The supracalycine nematophores are unique in their location, as they are placed so far to the side of the internode, placed on a small shelf or protuberance; they are relatively large. There is a mesial nematophore on each internode but the first, placed near the proximal end. On the hydrocladial process, the nematophore is placed on the face rather than in the axil, but there is a pseudonematophore directly on the process. There is 1 lateral nematophore on each cauline internode, nearer the proximal node, on the side opposite the hydrocladial process.

*Gonosome*.—(From an Anacapa specimen.) The gonangium, arising from the hydrocladial process, is much similar to that in several other species of the genus, e.g., *P. setacea* (Ellis), that is, elongated, elliptical, tapering to each end, but especially to the distal end; there is a small terminal opening.

*Distribution*.—Station 1253-41, 8 miles west of Cedros Island, 60-65 fathoms;  $\frac{1}{2}$  mile WNW of Anacapa Island, 41-43 fathoms.

*Remarks*.—This species bears some resemblance to *P. septata* Fraser, but it has none of the extra septa of this species, except the prominent one at the base of the hydrotheca; in this species, the supracalycine nematophores are placed in the usual position, not placed so far laterally as in *P. insolens*. *P. septata* has been obtained only off the Peruvian coast, a long way from the location of *P. insolens*.

### ***Plumularia integra*, new species**

Plate 39, Fig. 45

*Trophosome*.—The colony is quite long, 7 cm, and slender, as the hydrocladia are short, not more than 5 mm. The stem is simple, slender, unbranched, without nodes, or with nodes so faint that they can scarcely be recognized; the portion of it that represents an internode is long so that the hydrocladia on the same side (they are regularly, alternately arranged) are relatively distant. The hydrocladial process is long; the first internode is short and athecate; this is followed by a thecate internode of



medium length; the third internode is athecate, longer than the first but not so long as the second; thereafter, the thecate and athecate internodes follow in regular alternation. The internodes are all strongly septate, with a septum flanking each node on each side. There is but 1 septum in the first internode, and in the thecate internodes, there is a well marked septum at the base of the hydrotheca. The supracalycine nematophores are short; there is 1 mesial nematophore on each internode with the exception of the first. There is a nematophore in the axil of the hydrocladial process, and 1 near the distal end of that process; there are 2 cauline nematophores for each portion that corresponds to an internode, on the side opposite the hydrocladial process.

*Gonosome*.—Not observed.

*Distribution*.—Station 1419-41, 1 mile north of west end of Anacapa Island, 45-47 fathoms.

### ***Plumularia irregularis*, new species**

Plate 39, Fig. 46

*Trophosome*.—The colony, up to 20 mm, grows separately, not in clusters. The stem is simple, nodes irregularly placed, usually with more than 1 hydrocladium to an internode. The hydrocladia are all in the same plane, but irregularly placed, all the way from strictly alternate to strictly opposite. The hydrocladial process is not long but it has a nematophore in the axil and 1 farther out. The first hydrocladial internode is thecate; the second is athecate, and in most of the hydrocladia, thecate and athecate internodes alternate throughout; not uncommonly there may be 2 athecate internodes of nearly the same length between 2 consecutive, thecate internodes. There are a proximal, mesial nematophore, and 2 supracalycine nematophores on each thecate internode, and 1 mesial, on each athecate internode. On the stem, there may be 2 nematophores between 2 adjacent hydrocladia on the one side, or there may be but one. The septa in the hydrocladia are quite well marked.

*Gonosome*.—Not observed.

*Distribution*.—Station 1123-40, off San Nicolas Island, 28-31 fathoms.

*Remarks*.—The species bears a general resemblance to *P. setacea* (Ellis), but the hydrocladia are longer, and there are the several irregularities mentioned.

**Plumularia lagenifera** Allman

*Plumularia lagenifera* ALLMAN, Proc. Linn. Soc. London, 1885, p. 157.

FRASER, Hyd. Pacific Coast, 1937, p. 188.

FRASER, Hancock Hyd., 1, 1938, p. 65.

FRASER, *ibid.*, 2, 1938, p. 111.

FRASER, *ibid.*, 3, 1938, p. 136.

*Distribution.*—NE of Middle Farallone Island, Calif., 37 fathoms; Pacific Grove; 1 mile NE of San Miguel Island, 35-39 fathoms; south of San Miguel Island, 5-15 fathoms; Tyler Bight, shore; 1 mile south of Cardwell Point, 15-24 fathoms; Bechers Bay, Santa Rosa Island, 10 fathoms; 1½ miles east of South Point, 15-20 fathoms; 2¼ miles east of South Point, 23-28 fathoms; 2½ miles east of South Point, 17-18 fathoms; 3 miles east of South Point, 15-21 and 23-26 fathoms; Santa Cruz Channel, 32-34 fathoms; 3 miles SW of Fraser Point, Santa Cruz Island, 15-19 and 20-24 fathoms; ½ mile south of Gull Island, 34-41 fathoms; 1 mile east of Smugglers Cove, 19-20 fathoms; 1 mile north of San Pedro Point, 26-40 fathoms; 3 miles SE of Cat Rock, Anacapa Island, 23-25 fathoms; ¾ mile SE of Cat Rock, 23-25 fathoms; NE of Anacapa Island, 50 fathoms; 5 miles NE of Anacapa Island, 125-135 fathoms; 3½ miles south of Hueneme, Calif., 29-30 fathoms; 10¾ miles west of Point Dume, 47-48 fathoms; off Redondo Beach; off El Segundo, 28-31 fathoms; 2¼ miles south of San Pedro breakwater, 15 fathoms; 5 miles—152° from San Pedro breakwater, 17-19 fathoms; 6 miles SE of San Pedro breakwater, 20-21 fathoms; off Huntington Beach, 4-20 fathoms; 3½ miles—238° off Huntington Beach, 74-77 fathoms; in channel, Newport Harbor, 4-10 fathoms; 1 mile east of Empire Landing, Santa Catalina Island, 15-20 fathoms; Isthmus Cove, 80-100 fathoms; 2.8 miles WNW of Long Point, 64-88 fathoms; 5½ miles SE of Santa Catalina Island, 145-150 fathoms; off Pyramid Cove, San Clemente Island, 35-46 fathoms; off San Nicolas Island, 28-31 fathoms; Dutch Harbor, 15-22 fathoms; 1½ miles north of Cedros Island, 20-25 fathoms; 8 miles west of Cedros Island, 63-65 fathoms; South Bay, Cedros Island, 10-15 fathoms; 4 miles north of Dewey Channel, Lower Calif., 24-25 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms; off Gorda Point, Gulf of California, 25 fathoms; east of San Marcos Island, 15 fathoms; off San Jose Point, Guatemala, 12-13 fathoms; south of Viejas Island, Peru, shore.

**Plumularia margaretta** (Nutting)

*Monothecha margaretta* NUTTING, Amer. Hyd., I, 1900, p. 72.

*Plumularia margaretta* FRASER, Hancock Hyd., 1, 1938, p. 66.

FRASER, *ibid.*, 3, 1938, p. 136.

FRASER, Atlantic Hyd., 1944, p. 348.

*Distribution*.—3 miles off Seal Beach, Calif., 11 fathoms.

**Plumularia megalcephala** Allman

*Plumularia megalcephala* ALLMAN, Gulf Stream Hyd., 1877, p. 31.

FRASER, Hyd. Pacific Coast, 1937, p. 190.

*Distribution*.—3 miles north of Anacapa Island, 47-52 fathoms; off San Nicolas Island, 104 fathoms.

**Plumularia meganema**, new species

Plate 39, Fig. 47

*Trophosome*.—Colonies, up to 6 cm, grow from a stolon that forms an irregular reticulum in a mass of sponge; they may grow quite closely together but can scarcely be said to be clustered. The stem is of medium thickness, but short, relatively, to the hydrocladia, divided into regular internodes by quite well marked nodes. The slender hydrocladia are given off alternately in the same plane, 1 to each internode near its distal end. The first internode in each is short, athecate; the second is relatively long, thecate, with the small hydrotheca slightly nearer the distal end; the third internode is not quite so long as the second; then the thecate and athecate internodes appear in regular alternation; the whole hydrocladium being as much as 6 mm long. The internodal septa, 1 near each end of each internode, are well marked. The nematophores, and particularly the supracalycine, are characterized by their large size, or more particularly, their great length; the supracalycine nematophore is as much as 0.25 mm long. There is no nematophore on the short, proximal internode, but there is 1 mesial on each of the others. Of the cauline nematophores, there is a pair in or at the axil of each process and 1 lateral on each internode, on the side opposite the process.

*Gonosome*.—Not observed.

*Distribution*.—Station 650-37, east of San Francisco Island, Gulf of California, 47 fathoms; northeast of Anacapa Island, 45 fathoms;  $3\frac{1}{2}$  miles south of Hueneme, Calif., 29-30 fathoms; Rosario Bay, Lower Calif., 15 fathoms; east of San Marcos Island, Gulf of California, 18 fathoms; Puerto Refugio, Angel de la Guardia Island, 50-75 fathoms; off Magdalena Island, Tres Marias Islands, Mexico, 13 fathoms.

**Plumularia micronema** Fraser

*Plumularia micronema* FRASER, Hancock Hyd., 3, 1938, p. 142.

*Distribution*.—Off San Pedro; Tagus Cove, Albemarle Island, Galapagos, 10-18 fathoms.

**Plumularia mobilis**, new species

Plate 40, Fig. 48

*Trophosome*.—The colony is small, 18 mm, growing from a linear stolon. The branched stem is divided into regular internodes by well marked nodes; the same is true of the branch, which is very much similar to the stem in every way. The hydrocladial process is given off the distal end of the internode, adjacent to the distal node. It is difficult to describe the division of the hydrocladium into internodes as there seems to be no fixed plan of division. The internode next to the process is always athecate, but it varies much in length; in some of the hydrocladia, the second internode is thecate, but in others, a second, athecate internode appears before the first thecate internode. Following the first thecate internode, there may be 1 long, athecate internode, followed by a thecate internode, but just as often there are 2 athecate internodes present here; these vary much in length in different hydrocladia. The remainder of the hydrocladium has the same type of variation as that just described. In all of the internodes, there are flanking septa for each of the nodes, quite well marked. There is greater consistency in the nematophores; each thecate internode bears a pair of supracalycine nematophores and a mesial nematophore proximal to the hydrotheca; the first short, athecate internode has no nematophore, but each of the others has one. On the stem and branches there is a small nematophore in the axil of the hydrocladial process and 2 lateral nematophores on the side opposite the process.

*Gonosome*.—Not observed.

*Distribution*.—Station 1240-41, 9 miles off San Diego, Calif., 78-81 fathoms; 10¾ miles west of Point Dume, 47-48 fathoms; 1 mile SW of Ben Weston Point, Santa Catalina Island, 45-49 fathoms; 1½ miles north of Cedros Island, 45-55 fathoms.

**Plumularia multiramosa**, new species

Plate 40, Fig. 49

*Trophosome*.—Colonies, 9 cm, are segregated; the stem is simple but stout, giving rise to numerous long branches, alternately arranged, in the same plane, thus the colony is strongly flabellate; the primary branches



may give off short, secondary branches. The stem is divided into regular internodes, with the diameter at the base of each internode less than that at the distal end; the nodes are strongly marked but are not flanked with septa. From each internode, near the distal end, a hydrocladium is given off, the angle between the process and the stem being acute. The hydrocladial process is longer than usual in *Plumularia*. The hydrocladium is short; the first internode is short and is athecate; the second one is much longer and is thecate; after this athecate and thecate internodes appear in regular alternation. The hydrotheca appears in the distal one-third of the internode. The internodal septa are very noticeable; each node is flanked on each side by a septum, except that in the first, athecate internode, as it is so short there is but 1 septum. Besides these, on the thecate internode, there is a septum about midway between the hydrotheca and the proximal node, and 1 at the base of the hydrotheca. Besides the regular supracalcine nematophores, there are 2 mesial nematophores on the first thecate internode, and 1 on each of the following internodes; there is none on the first, athecate internode. There is a nematophore at the axil of the hydrocladial process and 1 on each cauline internode on the side opposite the hydrocladial process, approximately one-third of the distance from the proximal node.

*Distribution*.—Station 1472-42, north of Winchester Bay, Ore., 26-58 fathoms.

*Remarks*.—The species is much similar to *P. flabellum*, reported by Allman from Marion Island, south of South Africa, 50-75 fathoms (Allman, G. J., "Report on the Hydroida," *Challenger Reports*, XX, 1883, p. 19), but there are several noticeable differences. *P. flabellum* is strongly fascicled, the cauline internodes are uniform in diameter throughout, there may be 2 hydrocladia from 1 internode; there is a nematophore near the distal end of the hydrocladial process and a mesial on the first thecate internode (i.e., if one may judge from Allman's figures); the remainder of the hydrocladium agrees perfectly with that of *P. multiramosa*.

No other so strongly branched species of *Plumularia* has been reported from the Eastern Pacific. *P. corrugata* may be slightly branched, and in many respects it resembles this species, but it is a much more slender, and generally more delicate species than this. *P. adjecta* may be branched also but the same statement applies.



**Plumularia mutabilis**, new species

Plate 41, Fig. 50

*Trophosome*.—Large colonies, up to 20 cm, grow in clusters; the stem is stout, without distinct nodes, not very much darker in color than the light horn color hydrocladia. The arrangement of the hydrocladia varies in different parts of the colony. Most commonly, they are regularly alternate in the proximal portion, but strictly opposite in the distal portion. The slender hydrocladia are much like the proximal hydrocladia of *P. adjecta*, but the distal ones are not branched as they may be in that species. The nodes here are well marked, flanked on each side by internodal septa. The first internode is short, athecate; all the other internodes are longer, and are thecate, but the first is not so long as the others. The hydrotheca is placed much nearer the distal node. All the nematophores are small, the pair of supracalcine nematophores reaching but little beyond the margin of the hydrotheca. All the mesial nematophores are proximal to the hydrotheca, 1 on the first thecate internode and 2 on each of the others; there is none on the proximal, athecate internode. There is a nematophore at the base of the hydrocladial process; when the hydrocladia are opposite, there is a pair of opposite nematophores a short distance above the process; when the hydrocladia are alternate, there is a nematophore nearly opposite the process, but slightly below it.

*Gonosome*.—Not observed.

*Distribution*.—Station 1101-40, Agua Verde Bay, Gulf of California, 10 fathoms.

**Plumularia parva**, new species

Plate 41, Fig. 51

*Trophosome*.—Colony, very small and slender, 8 mm, grows singly from a non-reticular stolon. The stem is slightly sinuous, unbranched, divided into internodes of nearly the same length throughout, the nodes distinctly marked. The hydrocladia are given off alternately, all in the same plane, from short processes near the distal end of the internodes. There is no short proximal internode; the first one is thecate, the second, athecate, and farther the thecate and athecate internodes alternate. The athecate internodes are relatively long, sometimes almost as long as the thecate; on the thecate internode, the hydrotheca is situated about two-thirds of the way from the proximal node. The internodal septa are well marked, 1 near each end of the internode. There is 1 mesial nematophore to each internode, and a pair of supracalcine nematophores to each hydro-

theca. When the small size of the hydrotheca is taken into consideration, these may be said to be of medium size. On each cauline internode, there is a nematophore in the axil of the process, and 1 laterally placed on the side opposite to the process, nearer the proximal node than the distal.

*Gonosome*.—Not observed.

*Distribution*.—Station 792-38, off Daphne Minor Island, Galapagos, 70-80 fathoms; 1 mile SW of Ben Weston Point, Santa Catalina Island, 45-49 fathoms.

### ***Plumularia plumularoides* (Clark)**

*Halecium plumularoides* CLARK, Alaskan Hyd., 1876, p. 217.

*Plumularia plumularoides* FRASER, Hyd. Pacific Coast, 1937, p. 190.

*Distribution*.—East of Gull Island, south of Santa Cruz Island, 6-10 fathoms.

### ***Plumularia propinqua* Fraser**

*Plumularia propinqua* FRASER, Hancock Hyd., 1, 1938, p. 66.

FRASER, *ibid.*, 3, 1938, p. 136.

*Distribution*.—Outside Guaymas Bay, Sonora, Mexico, 6-10 fathoms.

### ***Plumularia reversa*, new species**

Plate 42, Fig. 52

*Trophosome*.—The colony is long and slender; the stem, 7.5 cm, is stout, without any indication of nodes. The slender hydrocladia are arranged alternately with an approach to regularity, all in the same plane. The cauline process that supports the hydrocladium is longer than usual. All of the hydrocladial internodes are thecate, long and slender, with the hydrotheca one-third of the distance or less from the proximal node. There are no internodal septa. Besides the supracalycine nematophores there is a mesial, proximal to the hydrotheca, and 1 near the distal end. On the hydrocladial process there is a pseudonematophore; with a normal nematophore just distal to it, and 1 at the axil of the process. On the stem there is a nematophore opposite, or nearly so, to the hydrocladial process.

*Gonosome*.—Not observed.

*Distribution*.—Station 1253-41, 8 miles west of Cedros Island, 64-65 fathoms; 1 mile SW of Ben Weston Point, Santa Catalina Island, 45-49 fathoms; 1½ miles north of Cedros Island, 20-25 fathoms; south of San Esteban Island, Gulf of California, 35 fathoms.

**Plumularia septata** Fraser

*Plumularia septata* FRASER, Hancock Hyd., 3, 1938, p. 143.

*Distribution*.—Off Lobos de Afuera Island, Peru, 25-30 fathoms; Independencia Bay, 9-10 fathoms; east of Viejas Island, Independencia Bay, 5 fathoms.

**Plumularia setacea** (Ellis)

*Corallina setacea* ELLIS, Nat. Hist. Corallines, 1755, p. 19.

*Plumularia setacea* FRASER, Hyd. Pacific Coast, 1937, p. 191.

FRASER, Hancock Hyd., 1, 1938, p. 66.

FRASER, *ibid.*, 2, 1938, p. 111.

FRASER, *ibid.*, 3, 1938, p. 136.

*Distribution*.— $2\frac{1}{4}$  miles east of South Point, Santa Rosa Island, 17-18 fathoms; 3 miles east of South Point, 17-20 and 23-26 fathoms;  $4\frac{1}{2}$  miles NE of Sandy Point, 35-36 fathoms; Willow Anchorage, Santa Cruz Island, shore; Anacapa Passage, 15-50 fathoms; east of Santa Barbara Island, 25-27 fathoms; 4 miles east of Santa Barbara Island, 40 fathoms; 3 miles off Seal Beach, 11 fathoms; 5 miles— $152^{\circ}$  from San Pedro breakwater, 17-19 fathoms; 4 miles east of Church Rock, Santa Catalina Island, 106-110 fathoms;  $2\frac{1}{2}$  miles SE of Church Rock, 60-80 fathoms; 1 mile SW of Ben Weston Point, 45-49 fathoms; off San Nicolas Island, 29-31 fathoms; Tanner Bank, 37-38 fathoms; 3 miles NW of Natividad Island, Lower Calif., 30-31 fathoms; 4 miles north of Dewey Channel, 24-25 fathoms; Dewey Channel, opposite San Eugenio Point, 21-24 fathoms.

**Plumularia sinuosa** Fraser

Plate 42, Fig. 53

*Plumularia sinuosa* FRASER, Hancock Hyd., 1, 1938, p. 67.

FRASER, *ibid.*, 3, 1938, p. 136.

*Gonosome*.—(Described for the first time from a specimen obtained at Station 607-36, San Lorenzo Channel, Gulf of California, 24 fathoms.) Gonangia small, globular, 0.125 mm in diameter, developed in the axil of the hydrocladial processes, with pedicels the same length as the diameter of the gonangium.

*Distribution*.—Laguna Beach, Calif., low tide; San Lorenzo Channel, Gulf of California, 24 fathoms; Panama City, shore.

**Plumularia venusta**, new species

Plate 42, Fig. 54

*Trophosome*.—Colony, 24 mm, is slender, graceful; the stem is divided into regular, long internodes, by faint, transverse nodes; each internode gives off a hydrocladium just below the distal node, hence the hydrocladia are regularly alternate. The hydrocladia are long, up to 5 mm, and slender; the nodes are well marked, and each is flanked on each side by a partial, but well marked, septum. The first internode is short, athecate; all the others are long, thecate; the first thecate is not as long as the others. The hydrotheca is about one-fourth of the length of the internode from its distal end. The athecate internode has no nematophore; the first thecate has 2 mesial nematophores, and each of the others has 3. The supracalycine nematophores are of the usual type. There is a nematophore at the axil of the hydrocladial process, and 2 cauline nematophores on the side opposite to the hydrocladial process, on each internode.

*Gonosome*.—Not observed.

*Distribution*.—Station 579-36, east of San Marcos Island, Gulf of California, 18 fathoms.

*Remarks*.—This species is little like any species so far reported from the Eastern Pacific, but it closely resembles *P. polynema* Fraser, described from near Marthas Vineyard, off the New England coast, although it is not possible, with the information available, to see how any distributional connection can exist between the 2 species.

*P. venusta* has not the same mode of growth and arrangement of branches as *P. polynema*. In the stem, the nodes are not so strongly marked; in the hydrocladium, there is the small, proximal, athecate internode, and the septa are well marked. The nematophores on the hydrocladium are similarly placed, but there are only 2 cauline nematophores instead of 3 on each internode. The gonosome has not been observed in either species.

**Genus SCHIZOTRICHA****Schizotricha tenella** (Verrill)

*Plumularia tenella* VERRILL, Invert. An. Vineyard Sound, 1874, p. 731.

*Schizotricha tenella* FRASER, Hancock Hyd., 1, 1938, p. 67.

FRASER, Atlantic Hyd., 1944, p. 358.

*Distribution*.—Off San Nicolas Island, 28-31 fathoms.

Genus **STREPTOCAULUS****Streptocaulus pulcherrimus** Allman

*Streptocaulus pulcherrimus* ALLMAN, Challenger Hyd., I, 1883, p. 48.

NUTTING, Amer. Hyd., I, 1900, p. 129.

FRASER, Hancock Hyd., 1, 1938, p. 67.

FRASER, *ibid.*, 3, 1938, p. 136.

*Distribution*.—Off Barrington Passage, Galapagos, 78 fathoms.



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# EXPLANATION OF PLATES

Unless otherwise indicated all the drawings have a magnification of  
20 diameters.

## PLATE 22

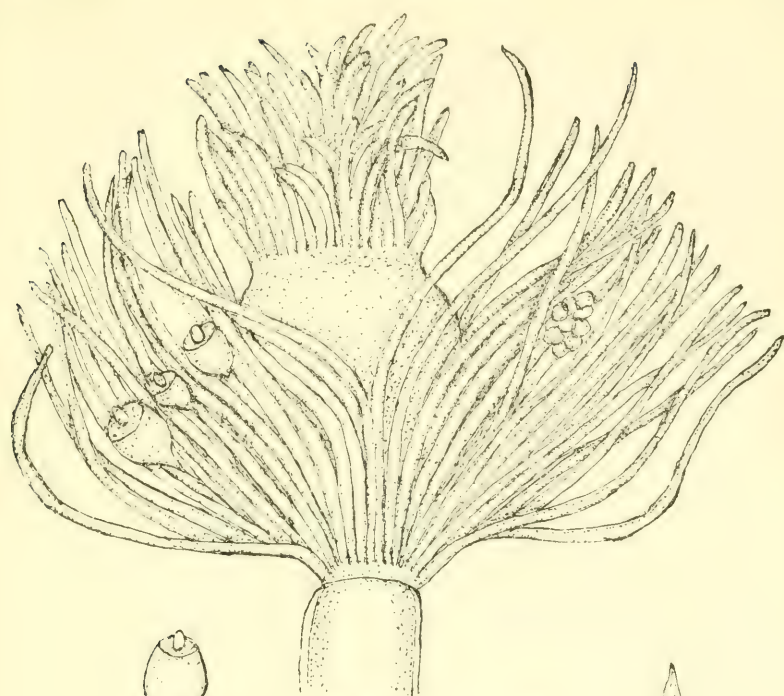
Fig. 1. *Hydractinia prolifica*, new species

- a. Natural size.
- b. and c. Nutritive zooids.
- d. A generative zooid.
- e. A group of spines.
- f. A single spine.

Fig. 2. *Ectopleura media*, new species

- a. Natural size.
- b. Hydranth with gonophores.
- c. Portion of gonophore with developing medusa buds.
- d. A fully developed medusa bud.





2b



2d



1a



1f



2c



2a



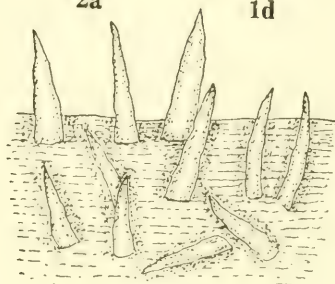
1d



1b



1c



1e

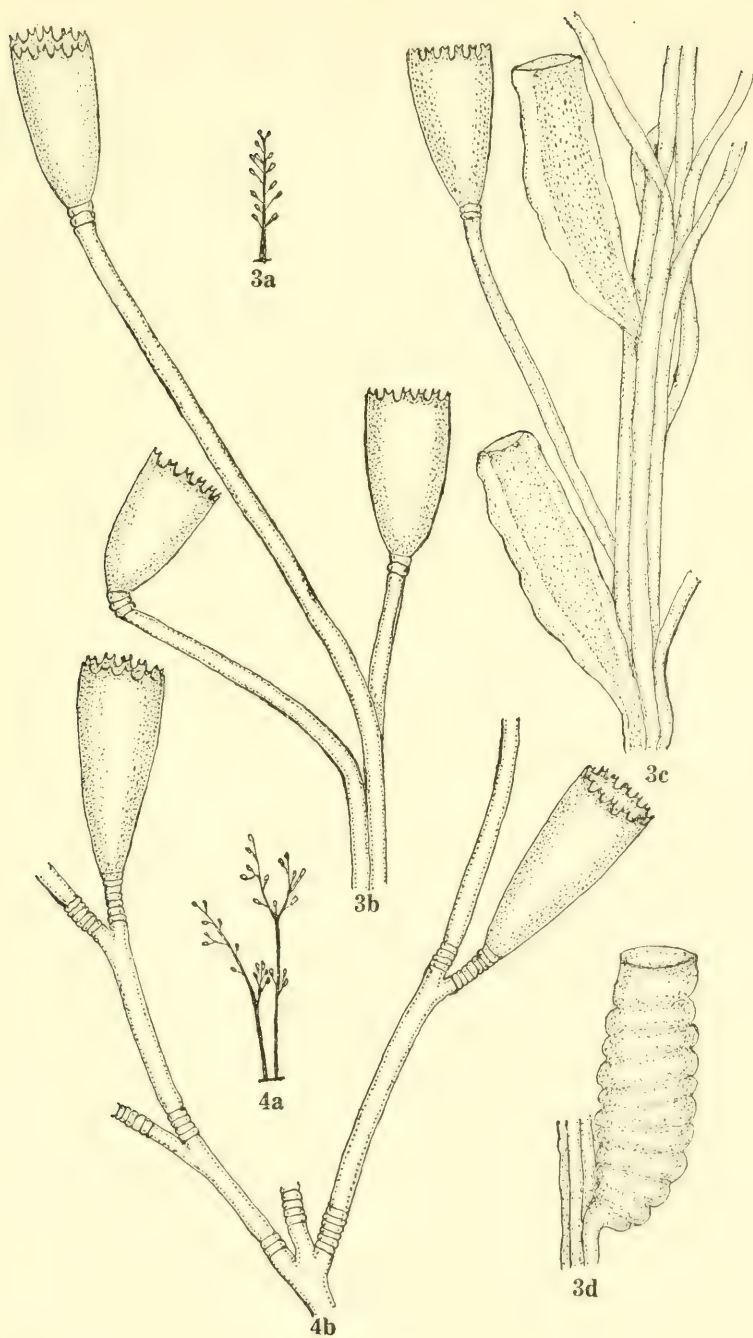
## PLATE 23

Fig. 3. *Campanularia altitheca*, new species

- a. Natural size.
- b. Hydrothecae with pedicels.
- c. Fascicled stem with hydrothecae and gonangia.
- d. A strongly corrugated gonangium.

Fig. 4. *Campanularia* (?) *diversa*, new species

- a. Natural size.
- b. Portion of colony showing hydrothecae.



## PLATE 24

Fig. 5. *Clytia exilis*, new species

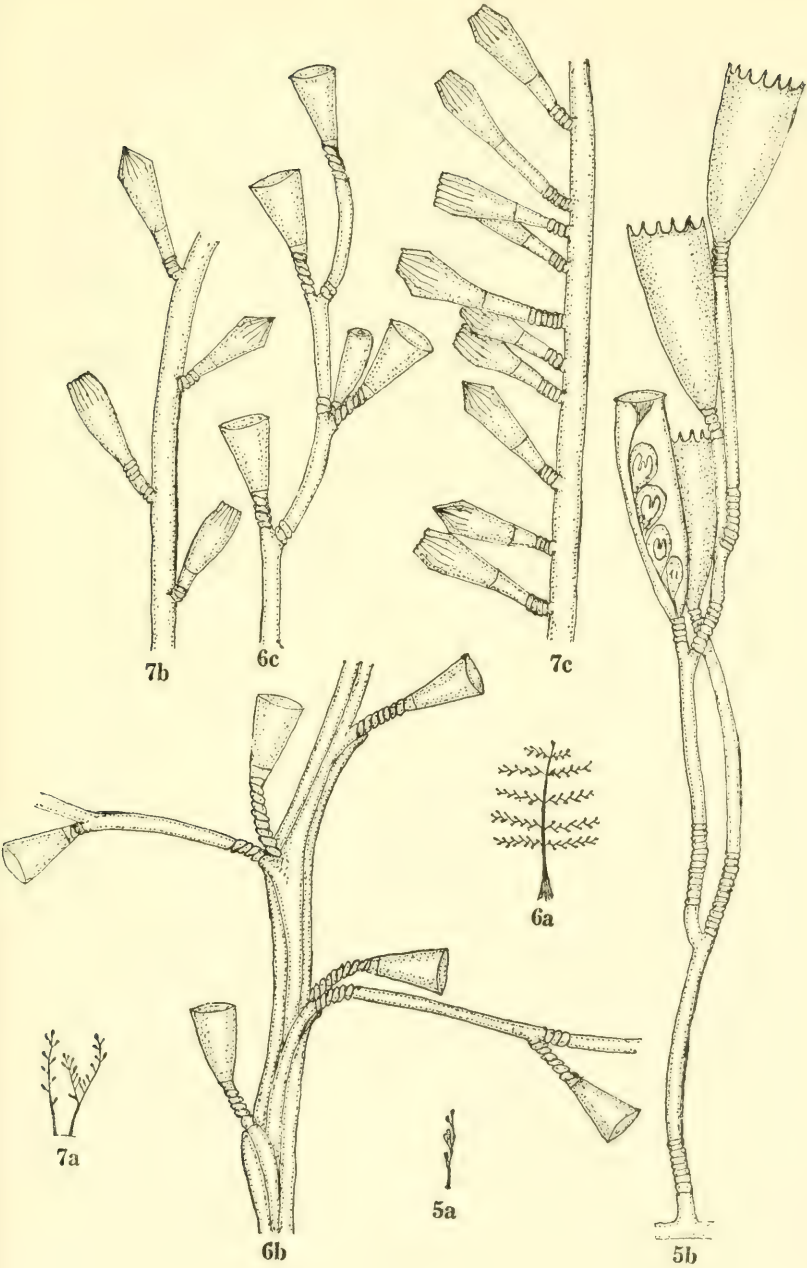
- a. Natural size.
- b. A colony showing hydrothecae and gonangia.

Fig. 6. *Obelia biserialis*, new species

- a. Natural size.
- b. Portion of fascicled stem and branches.
- c. Portion of simple stem with hydrotheca and gonangium.

Fig. 7. *Campanulina* (?) *indivisa*, new species

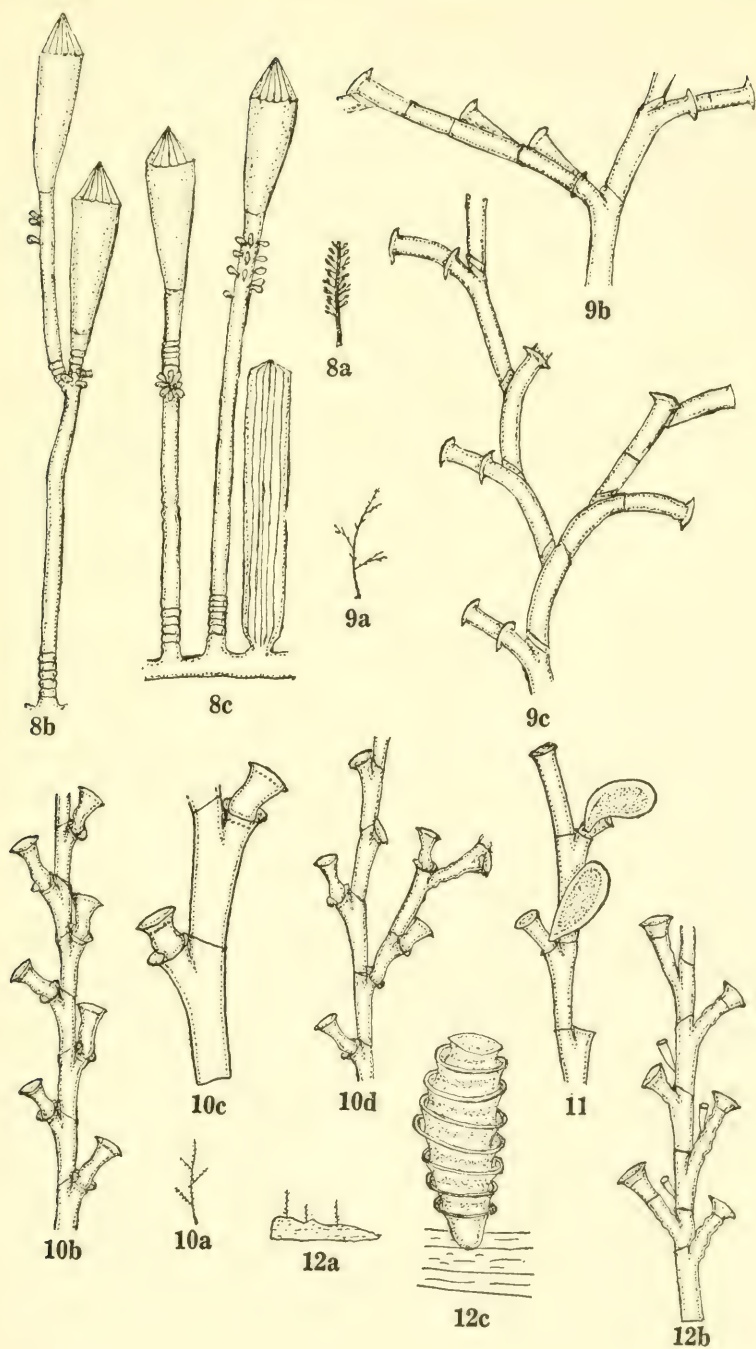
- a. Natural size.
- b. Portion of stem with alternate hydrothecae.
- c. Portion of stem with hydrothecae all on the one side.





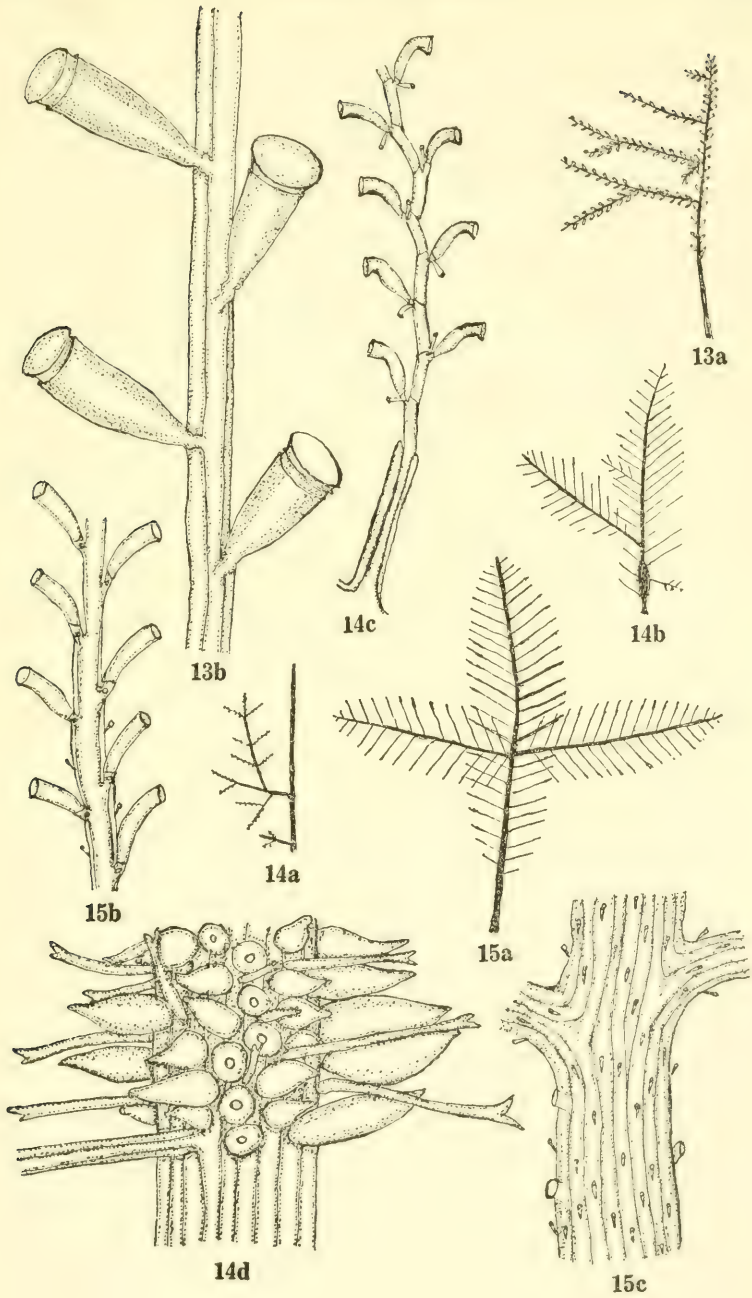
## PLATE 25

- Fig. 8. *Egmundella polynema*, new species  
a. Natural size.  
b. Colony with hydrothecae and nematophores.  
c. Colony with hydrothecae, nematophores, and gonangium.
- Fig. 9. *Halecium exiguum*, new species  
a. Natural size.  
b. and c. Portion of colony showing hydrophore arrangement.
- Fig. 10. *Halecium flexum*, new species  
a. Natural size.  
b. Portion of unbranched stem.  
c. Portion of the same stem (x40).  
d. Portion of branched stem.
- Fig. 11. *Halecium regulare* Fraser  
Portion of stem showing gonangia.
- Fig. 12. *Ophiodissa expansa*, new species  
a. Natural size.  
b. Portion of colony showing hydrophore arrangement and nematophores.  
c. Gonangium.



## PLATE 26

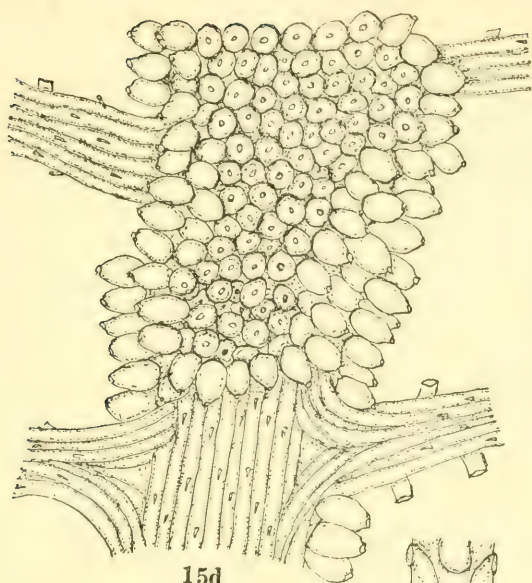
- Fig. 13. *Lafoea regia*, new species  
a. Natural size.  
b. Portion of fascicled stem with hydrothecae.
- Fig. 14. *Lictorella reflexa*, new species  
a. Natural size.  
b. Natural size with coppinia.  
c. Portion of stem with hydrothecae and nematophores.  
d. Portion of coppinia.
- Fig. 15. *Lictorella rigida*, new species  
a. Natural size.  
b. Portion of simple stem.  
c. Portion of fascicled stem.



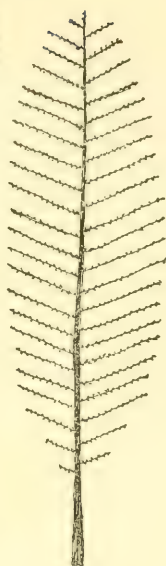
## PLATE 27

- Fig. 15. *Lictorella rigida*, new species  
d. Portion of coppinia.
- Fig. 16. *Abietinaria pacifica* Stechow  
a. Natural size.  
b. Portion of stem showing origin of branch.  
c. Portion of stem showing hydrothecae and gonangia.
- Fig. 17. *Selaginopsis constans*, new species  
a. Natural size.  
b. Portion of stem showing arrangement of hydrothecae.  
c. Portion of branch.

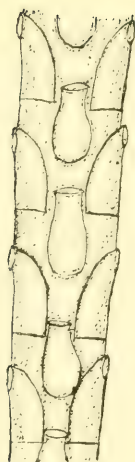




15d



16a



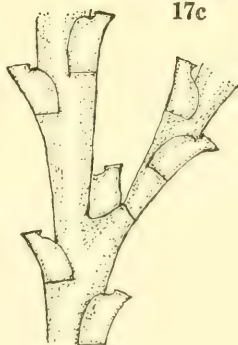
17b



17a



17c



16b



16c

## PLATE 28

Fig. 18. *Sertularella multiinoda*, new species

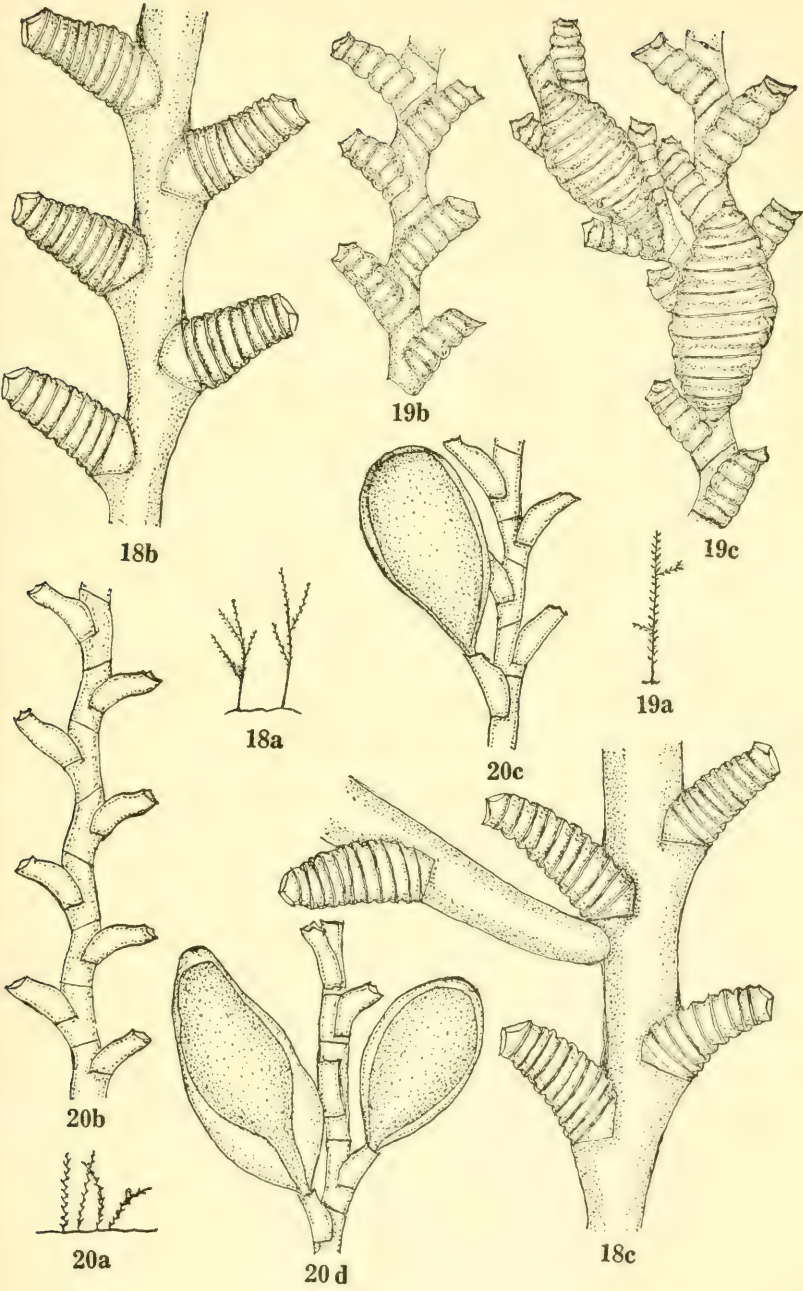
- a. Natural size.
- b. Portion of main stem with hydrothecae.
- c. Portion of stem with origin of branch.

Fig. 19. *Sertularella similis*, new species

- a. Natural size.
- b. Portion of stem showing arrangement of hydrothecae.
- c. Portion of stem and branch with gonangia.

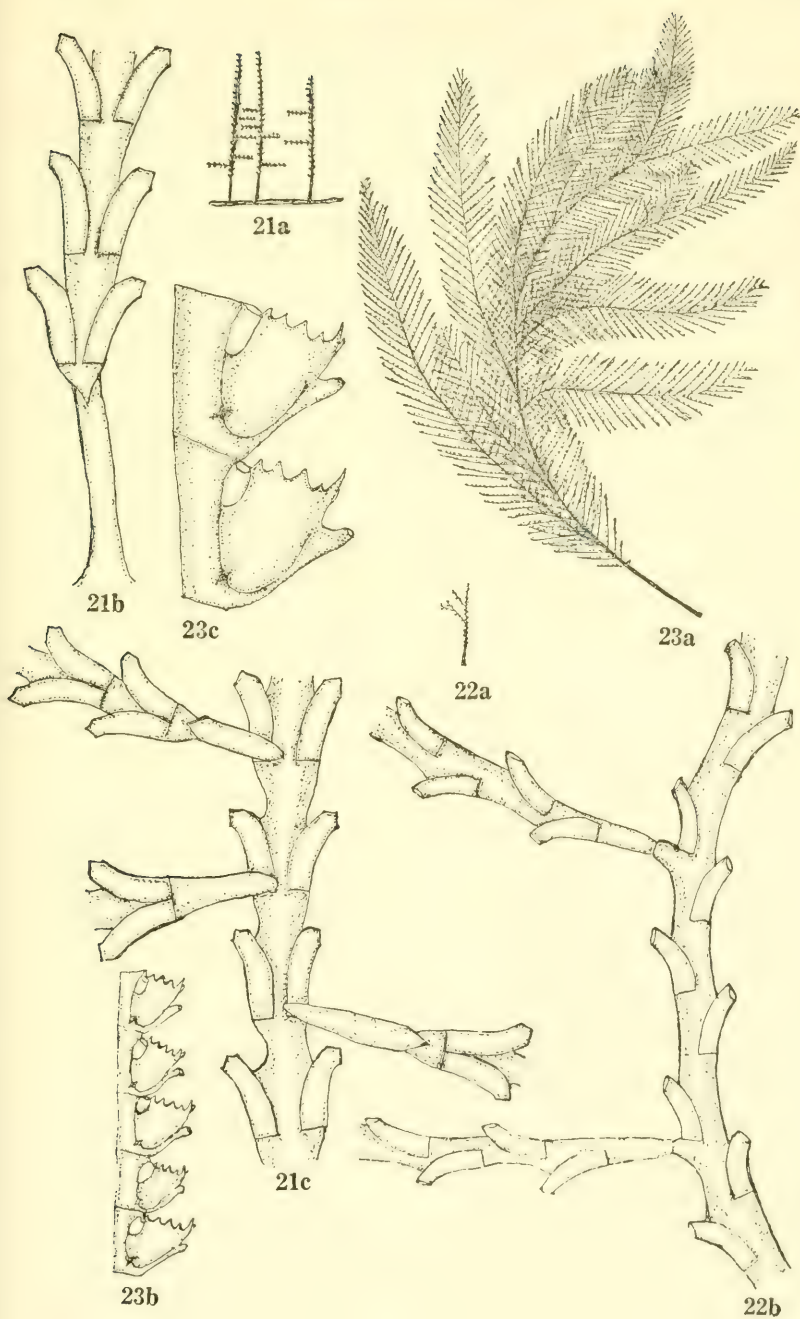
Fig. 20. *Sertularella sinuosa*, new species

- a. Natural size.
- b. Portion of sinuous stem with hydrothecae.
- c. and d. Gonangia.



## PLATE 29

- Fig. 21. *Sertularia stabilis*, new species  
a. Natural size.  
b. Basal portion of stem.  
c. Portion of stem with origin of branches.
- Fig. 22. *Thuiaria insociabilis*, new species  
a. Natural size.  
b. Portion of stem showing origin of branches.
- Fig. 23. *Aglaophenia dispar*, new species  
a. Natural size.  
b. Portion of hydrocladium with hydrothecae.  
c. Two hydrothecae (x40).





## PLATE 30

Fig. 23. *Aglaophenia dispar*, new species.

d. Corbula.

Fig. 24. *Aglaophenia diversidentata*, new species

a. Natural size.

b. Portion of hydrocladium with hydrothecae.

c. Two hydrothecae (x40).

d. Corbula.

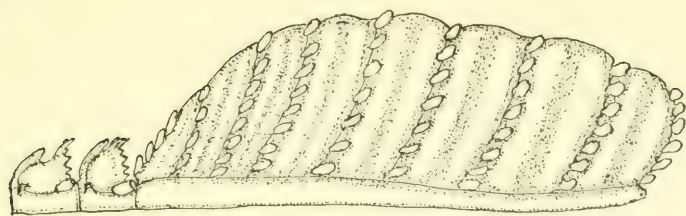
Fig. 25. *Aglaophenia epizoica*, new species

a. Natural size.

b. Portion of hydrocladium with hydrothecae.

c. Two hydrothecae (x40).

d. Corbula.



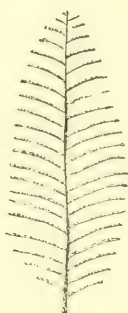
23d



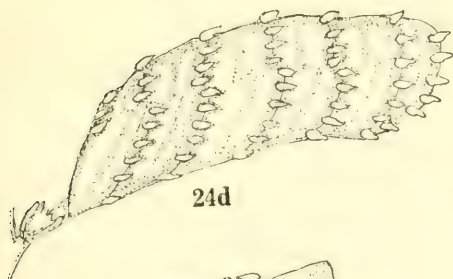
24b



24c



24a



24d



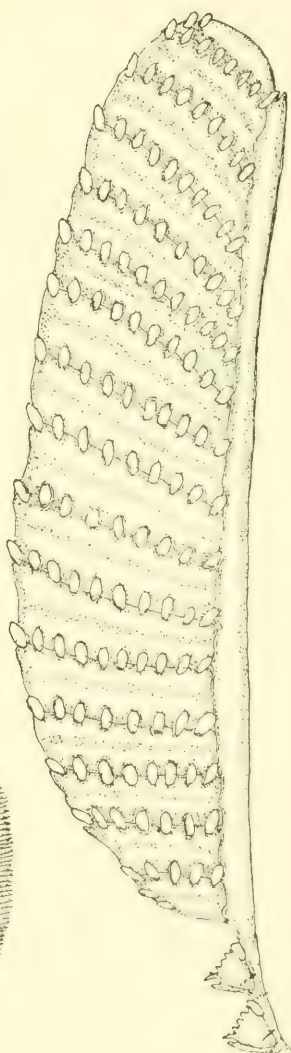
25b



25c



25a



25d

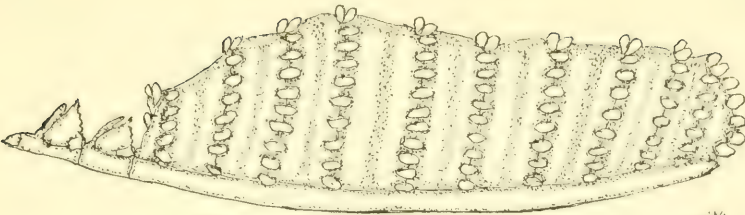
## PLATE 31

Fig. 26. *Aglaophenia fluxa*, new species

- a. Natural size.
- b. Portion of hydrocladium with hydrothecae.
- c. Two hydrothecae (x40).
- d. Corbula.

Fig. 27. *Aglaophenia integriseptata*, new species

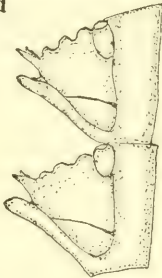
- a. Natural size.
- b. Portion of hydrocladium with hydrothecae.
- c. Two hydrothecae (x40).
- d. Corbula.



26d



26a



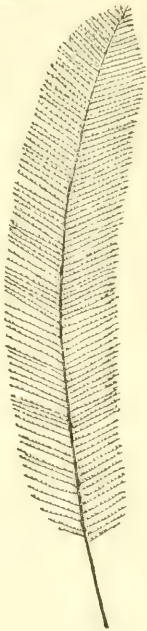
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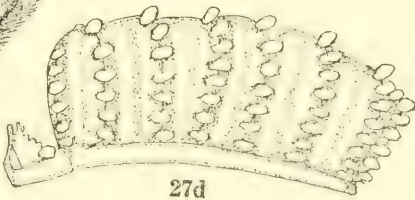
27b



26c



27a



27d



26b

## PLATE 32

Fig. 28. *Aglaophenia late-septata*, new species

- a. Natural size.
- b. Portion of hydrocladium with hydrothecae.
- c. Two hydrothecae (x40).
- d. Corbula.

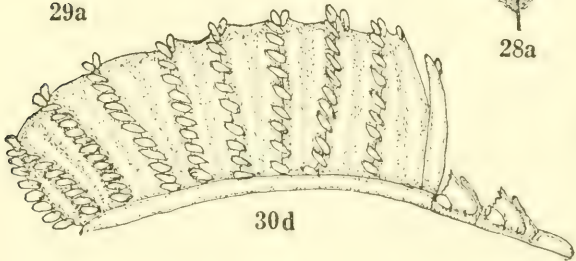
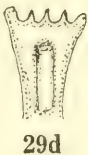
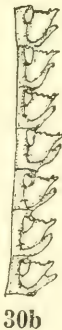
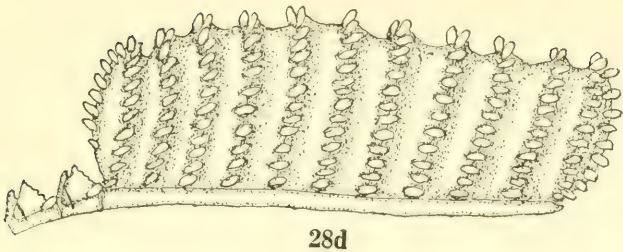
Fig. 29. *Aglaophenia triplex*, new species

- a. Natural size.
- b. Portion of hydrocladium with hydrothecae.
- c. Two hydrothecae (x40).
- d. Face view of hydrotheca (x40).

Fig. 30. *Aglaophenia venusta*, new species

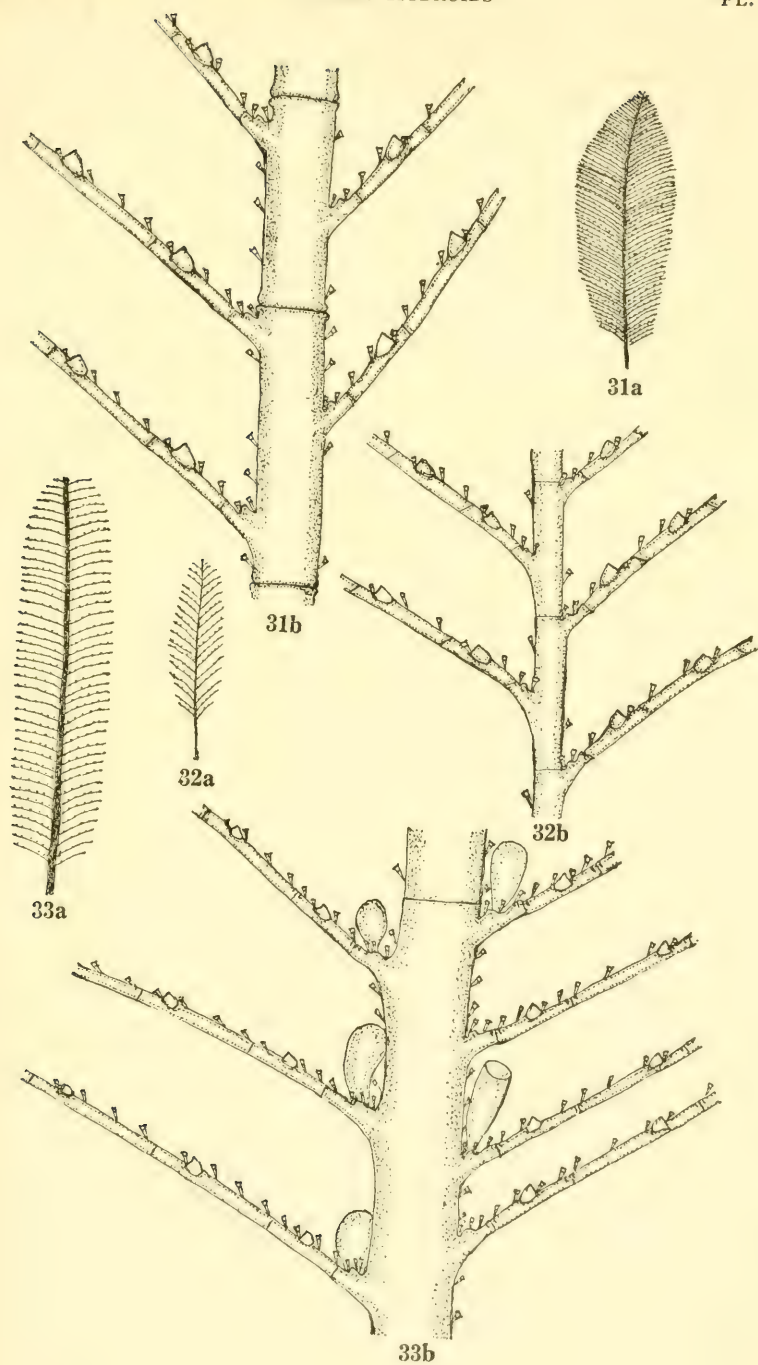
- a. Natural size.
- b. Portion of hydrocladium with hydrothecae.
- c. Two hydrothecae (x40).
- d. Corbula.





## PLATE 33

- Fig. 31. *Antennularia constricta*, new species  
a. Natural size.  
b. Portions of stem and hydrocladia.
- Fig. 32. *Antennularia gracilis*, new species  
a. Natural size.  
b. Portions of stem and hydrocladia.
- Fig. 33. *Antennularia inconstans*, new species  
a. Natural size.  
b. Portions of stem and hydrocladia with gonangia.



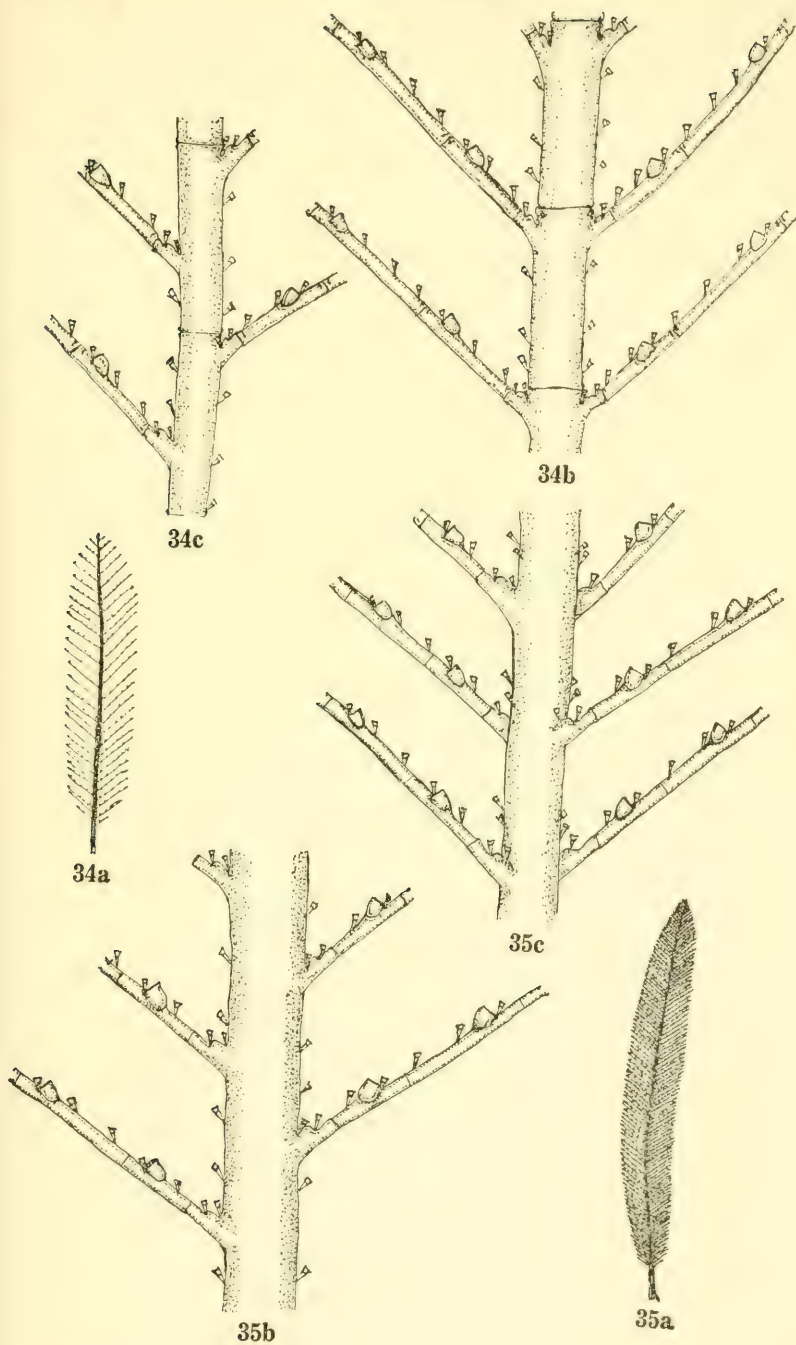
## PLATE 34

Fig. 34. *Antennularia inverta*, new species

- a. Natural size.
- b. Proximal portion of stem and hydrocladia.
- c. Distal portion of stem.

Fig. 35. *Antennularia mutabilis*, new species

- a. Natural size.
- b. Proximal portion of stem and hydrocladia.
- c. Distal portion of stem.





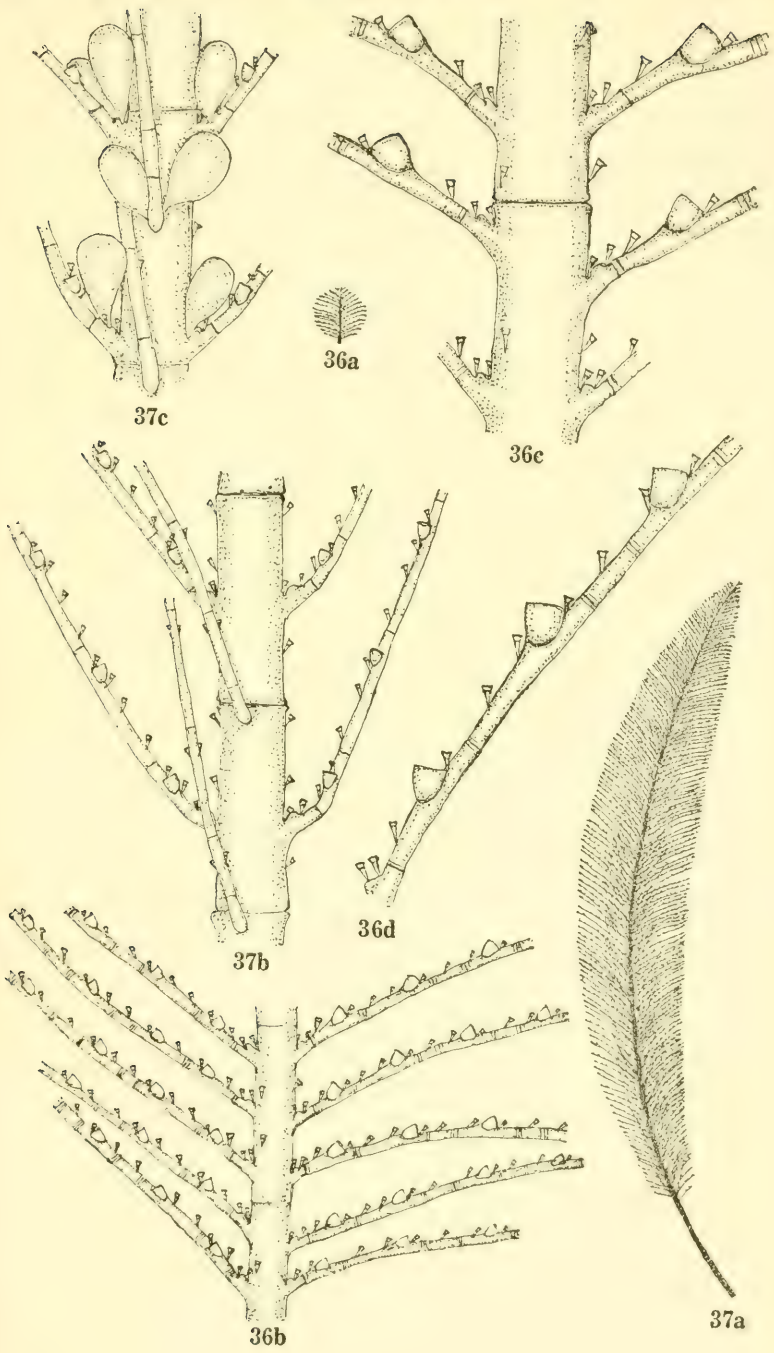
## PLATE 35

Fig. 36. *Antennularia parva*, new species

- a. Natural size.
- b. Portions of stem and hydrocladia.
- c. Portion of stem and hydrocladia (x40).
- d. Portion of hydrocladium (x40).

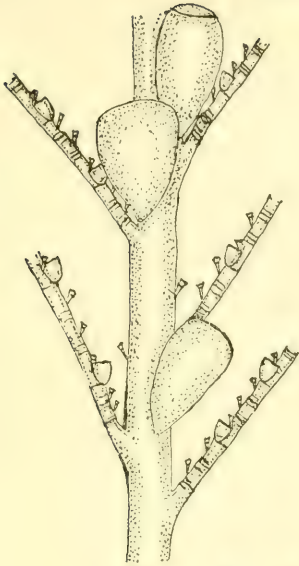
Fig. 37. *Antennularia polynema*, new species

- a. Natural size.
- b. Portion of colony showing arrangement of hydrocladia.
- c. Portion of colony with gonangia.



## PLATE 36

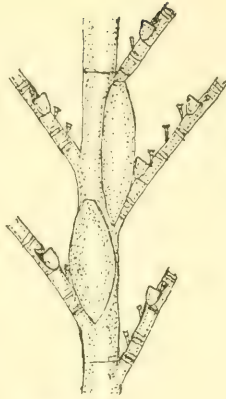
- Fig. 38. *Antennularia septata* Fraser  
a. and b. A portion of each of two colonies to show the two different types of gonangia.
- Fig. 39. *Cladocarpus* (?) *gracilis*, new species  
a. Natural size.  
b. The first hydrotheca and the portion of the stem or hydrocladium proximal to it.  
c. A median portion of stem or hydrocladium.  
d. Two hydrothecae (x40).
- Fig. 40. *Cladocarpus moderatus*, new species  
a. Natural size.  
b. Portion of stem with the proximal portion of hydrocladium.
- Fig. 41. *Cladocarpus pinguis*, new species  
a. Natural size.



38a



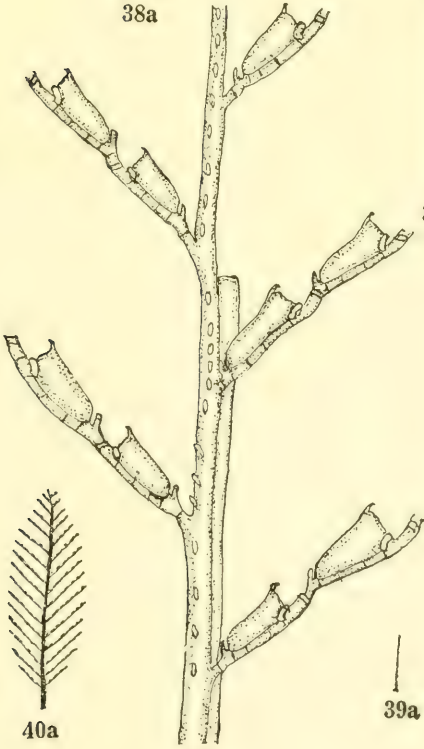
39d



38b



39b



40b



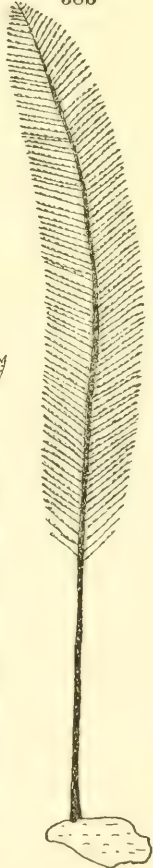
40a



39a



39c



41a

## PLATE 37

Fig. 41. *Cladocarpus pinguis*, new species

- b. Portion of hydrocladium with hydrothecae.
- c. Two hydrothecae (x40).
- d. Phylactogonium and gonangia.

Fig. 42. *Plumularia adjecta*, new species

- a. Natural size.
- b. Portion of stem with unbranched hydrocladia.
- c. Portion of branch with short hydrocladia.
- d. Gonangia.





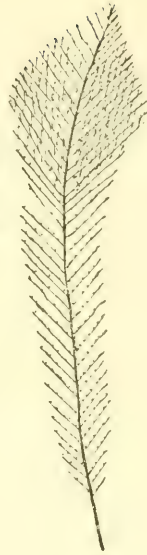
41b



41c



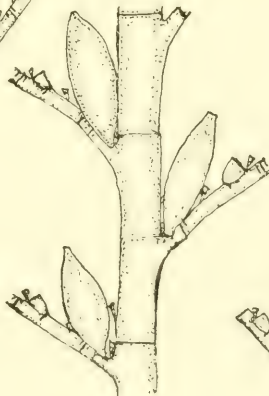
41d



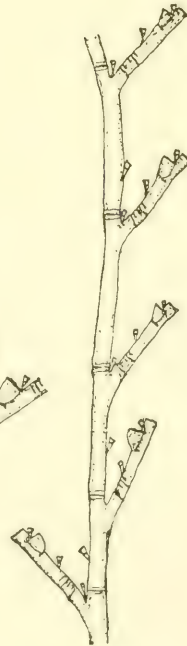
42a



42b



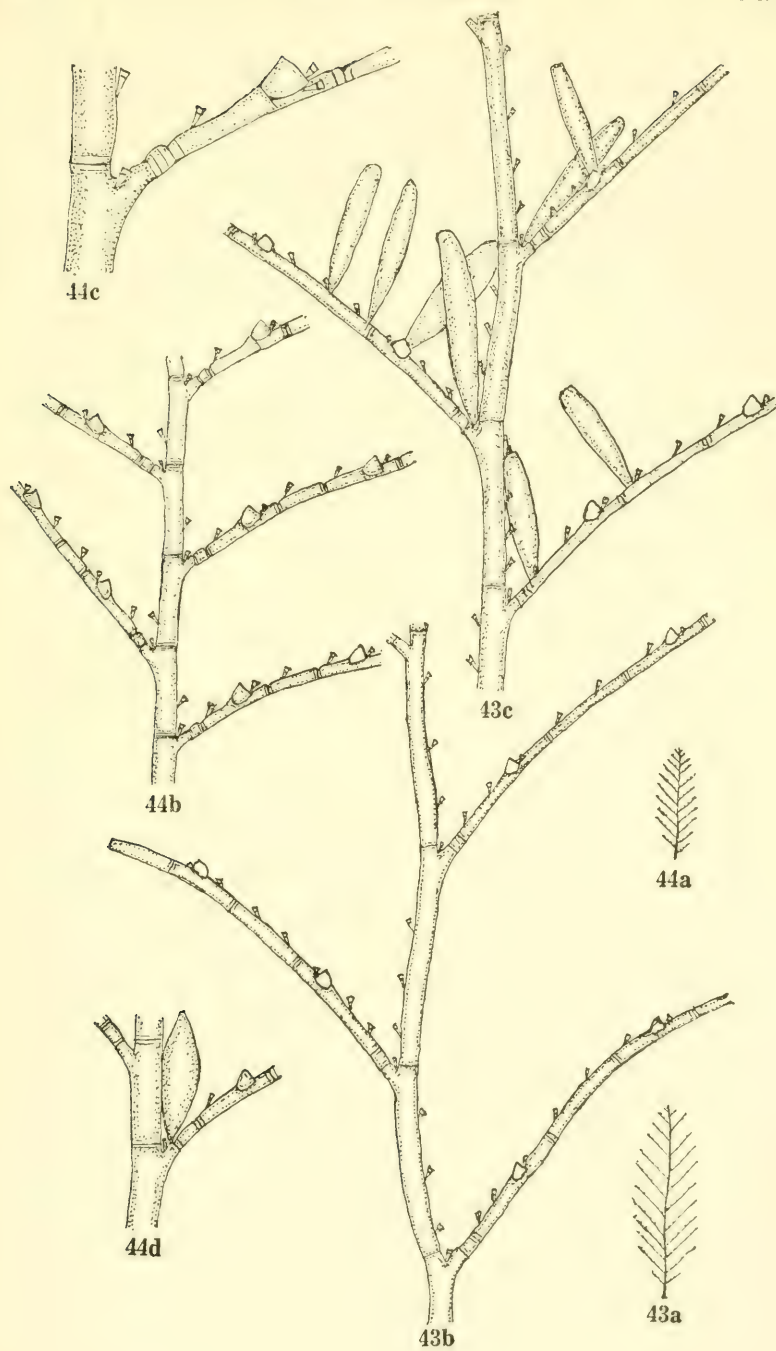
42d



42c

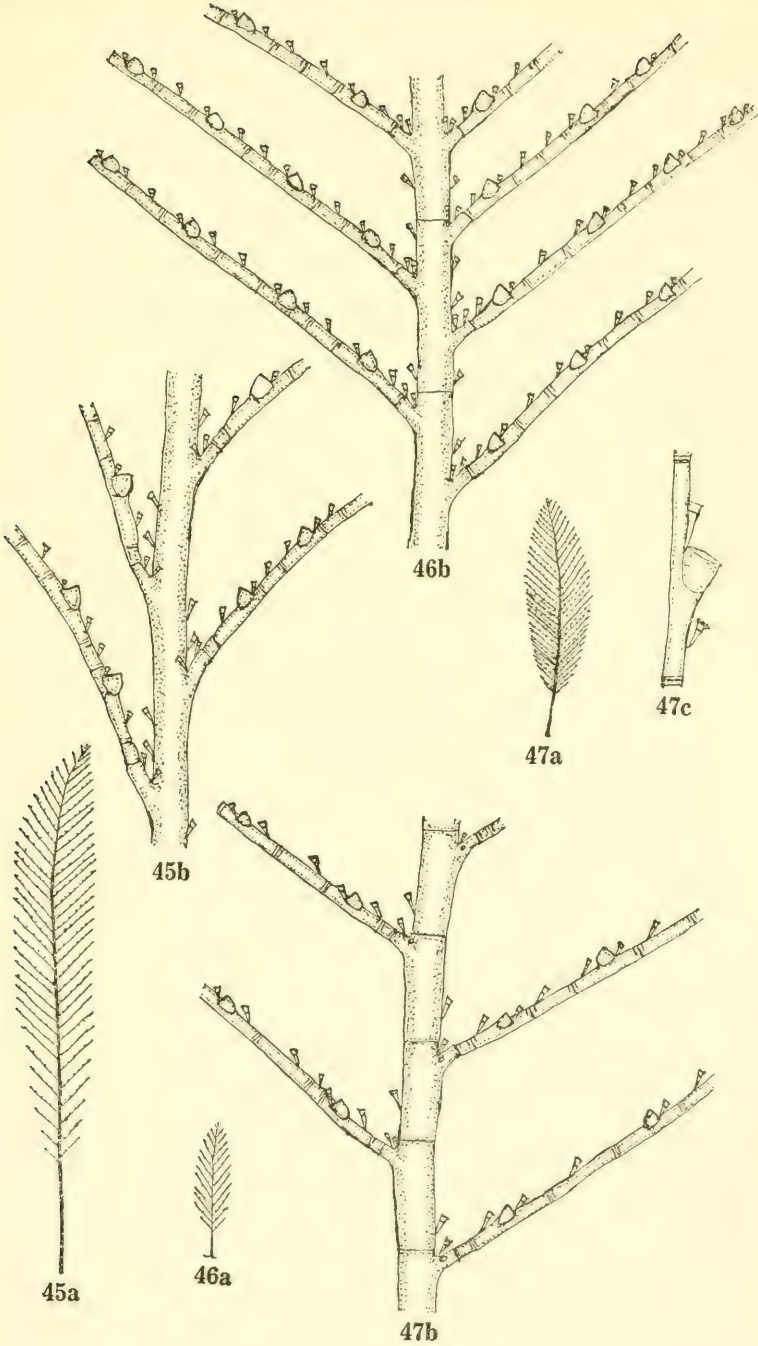
## PLATE 38

- Fig. 43. *Plumularia exilis*, new species
- a. Natural size.
  - b. Portion of colony to show arrangement of hydrocladia.
  - c. Gonangia.
- Fig. 44. *Plumularia insolens*, new species
- a. Natural size.
  - b. Portion of stem with hydrocladia.
  - c. Portion of stem with proximal portion of hydrocladium (x40).
  - d. Gonangium.



## PLATE 39

- Fig. 45. *Plumularia integra*, new species  
a. Natural size.  
b. Portion of stem with hydrocladia.
- Fig. 46. *Plumularia irregularis*, new species  
a. Natural size.  
b. Portion of stem with hydrocladia.
- Fig. 47. *Plumularia meganema*, new species  
a. Natural size.  
b. Portion of stem with hydrocladia.  
c. Portion of hydrocladium showing nematophores.





## PLATE 40

Fig. 48. *Plumularia mobilis*, new species

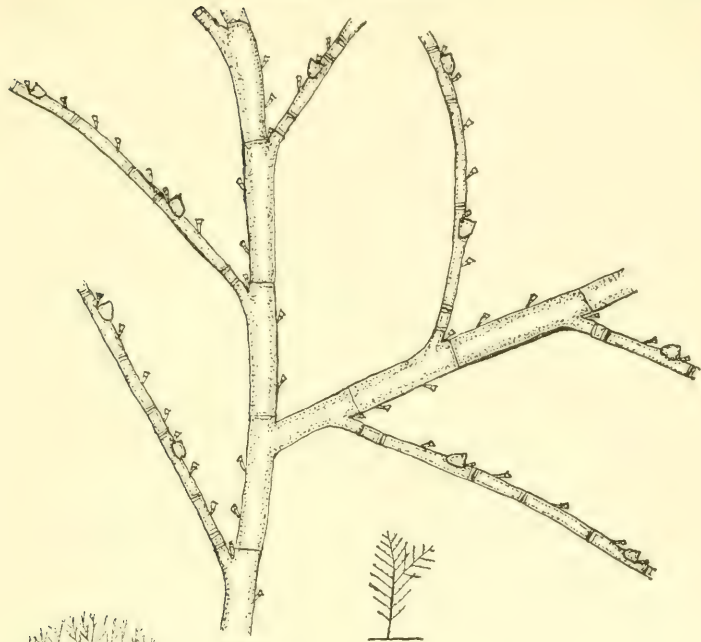
a. Natural size.

b. Portion of colony showing stem, branch, and hydrothecae.

Fig. 49. *Plumularia multiramosa*, new species

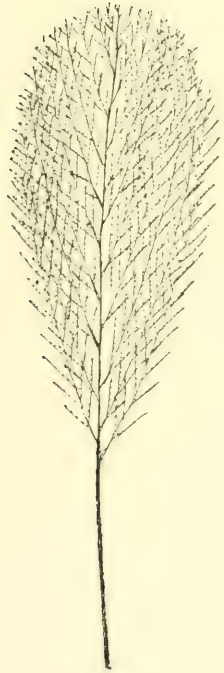
a. Natural size.

b. Portion of stem with hydrocladia.

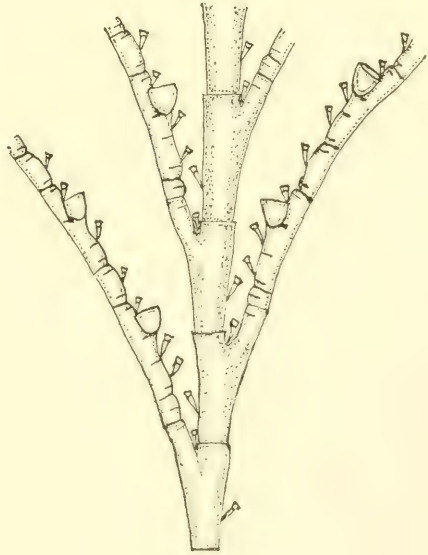


48b

48a



49a



49b

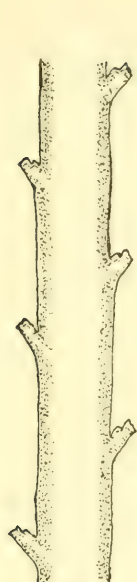
## PLATE 41

Fig. 50. *Plumularia mutabilis*, new species

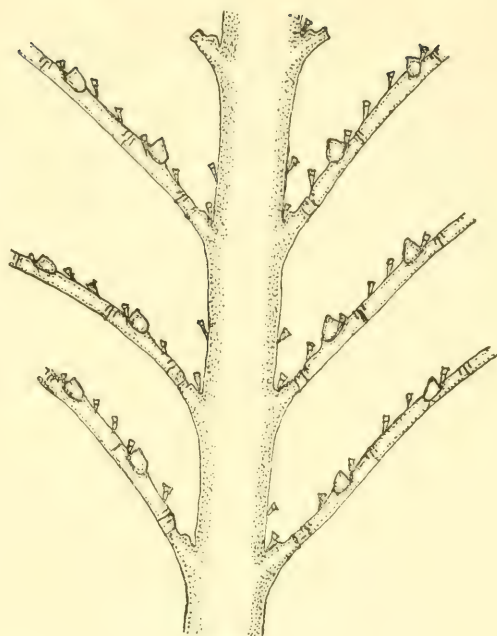
- a. Natural size.
- b. Distal portion of the stem with hydrocladia.
- c. Proximal portion of the stem.

Fig. 51. *Plumularia parva*, new species

- a. Natural size.
- b. Portion of stem with hydrocladia.



50c



50b



51a



51b



50a

## PLATE 42

Fig. 52. *Plumularia reversa*, new species

a. Natural size.

b. Portion of stem with hydrocladia.

Fig. 53. *Plumularia sinuosa* Fraser

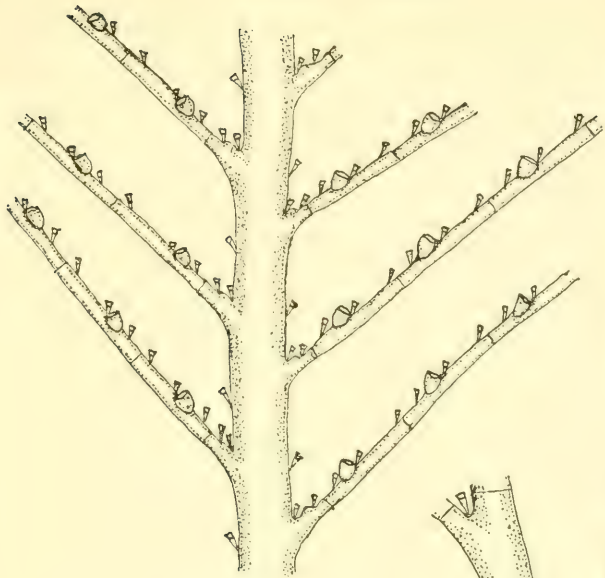
Portion of stem and hydrocladium with gonangium (x40).

Fig. 54. *Plumularia venusta*, new species

a. Natural size.

b. Portion of stem with hydrocladia.

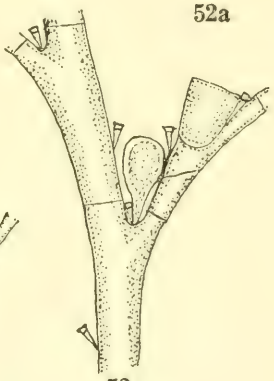




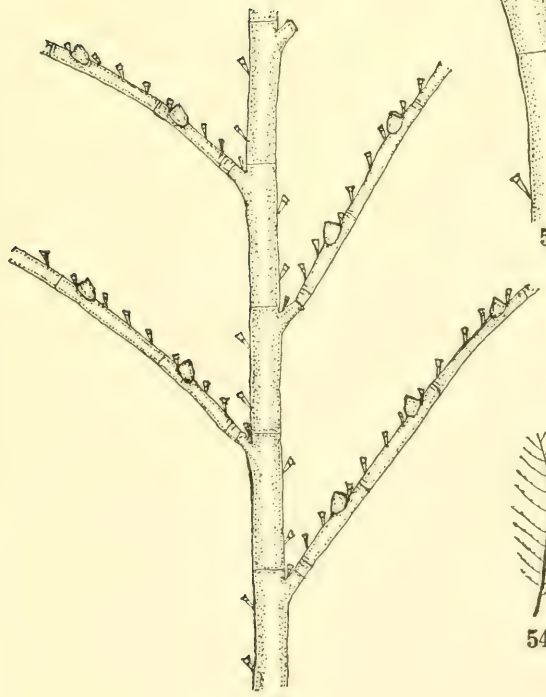
52b



52a



53



54b



54a



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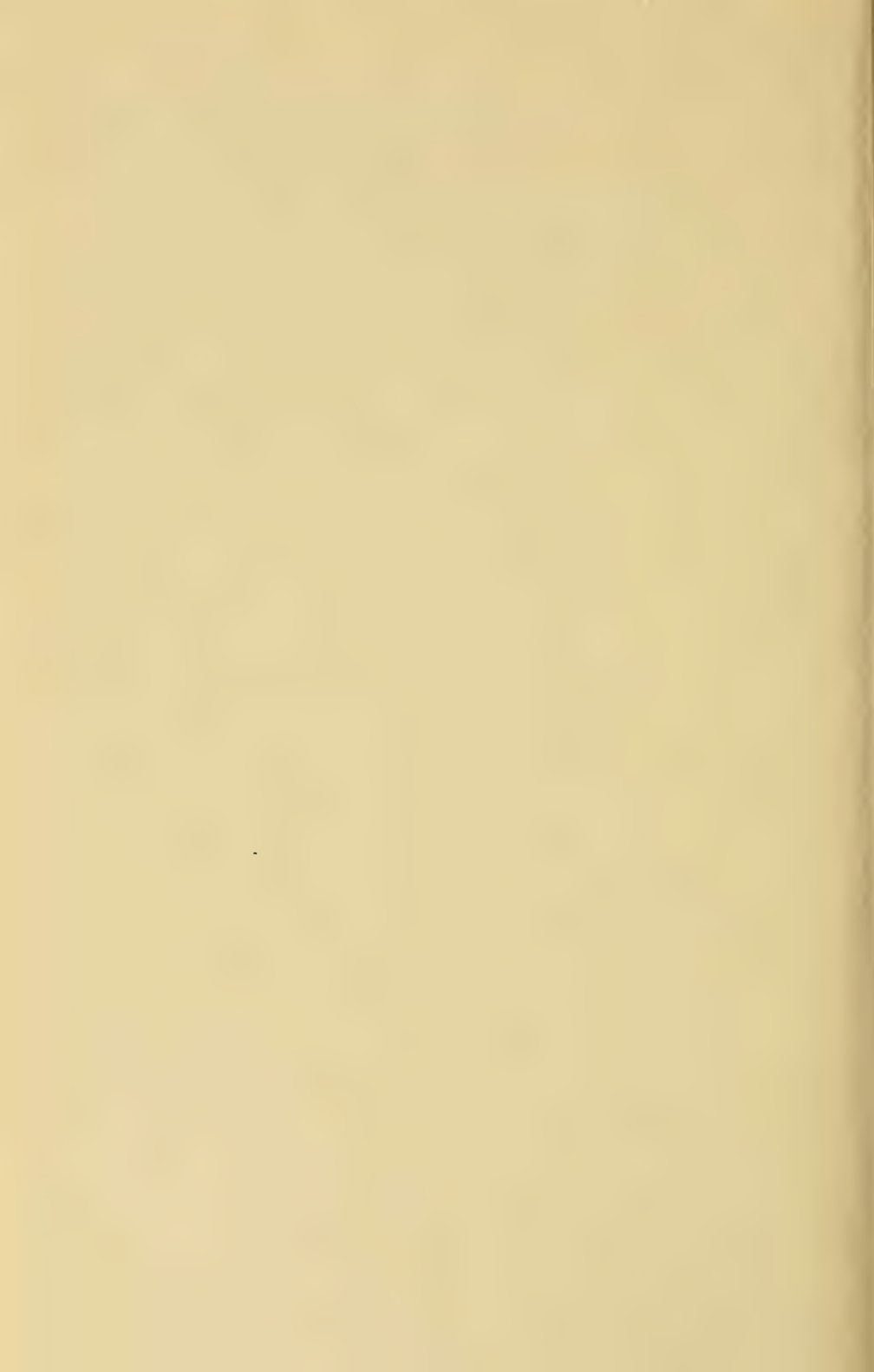
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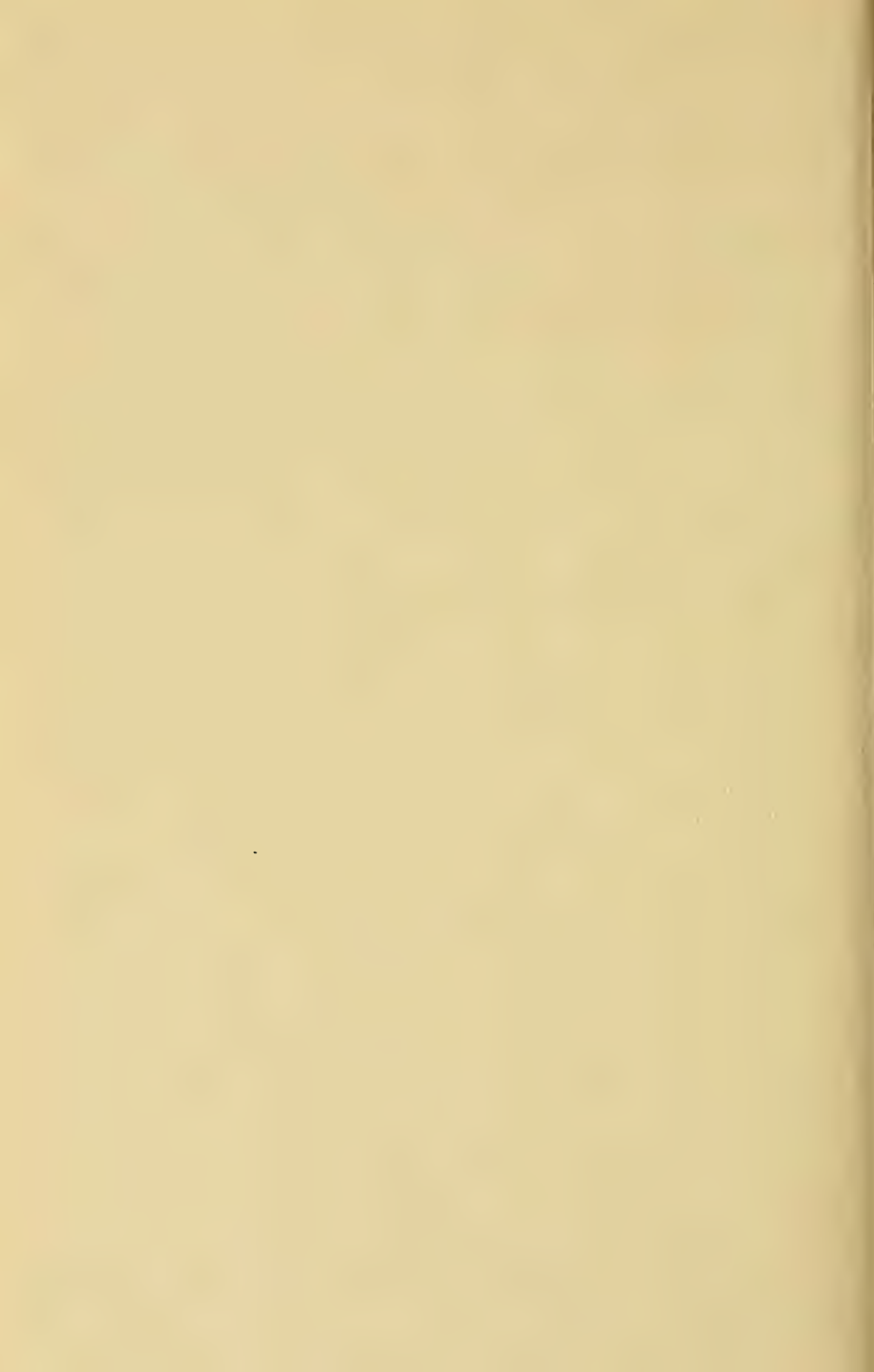
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